

JPRS 77158

13 January 1981

Worldwide Report

ENVIRONMENTAL QUALITY

No. 283

FBIS FOREIGN BROADCAST INFORMATION SERVICE

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BRIEFS

ANTIPOLLUTION BILL INTRODUCED--New Delhi, Nov. 24. The Government today introduced in the Lok Sabha a Bill to provide for the prevention, control and abatement of air pollution and for the establishment of boards to help carry out this purpose. In the United Nations conference on human environment held in Stockholm, in 1972--in which India participated--a decision was taken to take steps for the preservation of natural resources of the earth which, among other things, include the preservation of natural resources of the earth which, among other things, include the preservation of the quality of air and control of air pollution. This Bill aims to implement this decision as far as India is concerned.--UNI. [Text] [Madras THE HINDU in English 25 Nov 80 p 9]

CSO: 5000

DOW CHEMICAL OFFICER STRESSES PUBLIC RELATIONS NEED

Wellington THE EVENING POST in English 25 Nov 80 p 15

/Text/ Companies involved in health and environmental fields should step up their public relations and scientists, particularly, should become involved, according to a representative of the Dow Chemical Company, Dr E H Blair.

Dr Eteyl Blair is vice-president and director of health and environmental sciences for the company in the United States. He is on a brief visit to New Zealand and last night addressed the New Zealand Institute of Agricultural Sciences and the Royal Society.

Scientists should get out of their laboratory coats to help combat excessive regulations in the fields.

"Credibility is our currency. It is the only way we can meet the future," he said.

The Dow Company had taken a strong position and spoken out about 2,4,5-T and in the carcinogenic area, he said. A year ago the chairman of the company had stressed that there should be more involvement with Government.

If those who understood such subjects did not become involved, then the Government could make serious mistakes by making regulations without understanding all the factors involved.

The key laws in the United States relating to agricultural chemicals were on pesticides, air, water and drinking water, which came under the Environmental Protection Agency. Laws relating to drugs and packaging materials were under the Food and Drug Administration.

The cost of administering the regulations was \$1.7 billion. More than \$5 billion was spent on research aspects in these areas.

In the 80s, environmental control expenditure would

continue, testing and possibly banning of chemicals would increase, more information would be collected and made publicly available. There would also be more information available to assess hazards, firms would become more selective of product choices.

He commented that in the United States, radical environmentalists and "Naderites" were carrying out an active programme, which was also highly political to bring about regulations.

Mr Nader had become totally arrogant and inflexible said Dr Blair. The courts were beginning to realise that Nader spoke for Nader and nobody else.

ESTABLISHMENT OF MARINE RESERVES, PARKS WEIGHED

Auckland THE NEW ZEALAND HERALD in English 26 Nov 80 p 2

/Text/ Kaikohe (HERALD correspondent)--The setting-up of marine reserves and parks in the north may be looked into.

The Bay of Islands Maritime and Historic Park Board is considering asking its scientific committee to carry out a survey of marine life in adjoining areas.

The survey would be undertaken with a view to establishing marine reserves and parks.

Grant of Control

A Lands and Survey Department planning officer, Mr D. Millar, told the board yesterday that it was not envisaged that such reserves would restrict the public.

Rather, they would help to ensure that the essential enjoyment and resources of the marine environment and ecology would be protected and enhanced for the future.

The park board will apply to the Minister of Transport,

Mr McLachlan, for a grant of control of the foreshore adjoining the park area.

Mr Millar said the foreshore area was a no-man's land between areas controlled by the Bay of Islands County Council and under the jurisdiction of the Northland Harbour Board.

The park board decided to advise the Minister of Agriculture and Fisheries, Mr MacIntyre, that it believes there is a potential for possible marine parks in the waters adjoining Motukawanui Island in the Cavalli group, Whangamumu Harbour, Whangaruru North Head and Percy Island.

Suitable Areas

The board will also prepare draft bylaws to cover parkland and any foreshore or waters over which it

could obtain grant of control.

Mr Millar said the Ministry of Agriculture and Fisheries had recently implemented a policy to investigate and identify suitable areas for marine reserves and parks.

The concept of marine reserves and parks was compatible with the board's objective and could resolve many of the problems associated with the shoreline and tidal boundaries.

But it was clear that any board proposal should both meet the legal requirements and be based on ecological and environmental principles.

Mr Millar said there was no legal reason to prevent the park board from applying for a grant of control under the Harbours Act.

PROPOSED METHANOL PLANT FAILS ENVIRONMENTAL TEST

Auckland THE NEW ZEALAND HERALD in English 27 Nov 80 p 5

[Text] Wellington (Press Association)--The Commission for the Environment considers the present Petralgas proposal to establish a methanol plant in the Waitara Valley does not meet the environmental standards required for that location.

But it says in its audit of the combined Petrocorp-Alberta Gas Chemicals of Canada project, that the proposal does not present unmanageable environmental problems, with one possible exception—the interference of the plant's flare with the aircraft instrument approach to New Plymouth Airport.

In its own environmental impact report, Petralgas said the \$140 million plant, which will produce 1200 tonnes of methanol a day, would have little adverse impact on the Taranaki countryside surrounding the site.

However, the Commission for the Environment says Petralgas has summarily dismissed many areas of environmental concern as being of little note and has failed to consult local people sufficiently.

It calls for a Petralgas commitment to design and run the plant in a manner which will enhance rather than detract from the environmental quality of the area.

The commission says the company has failed to recognise the full implications of its project on the rich Taranaki farming landscape through its demand for land and water—resources traditionally available solely for agricultural production.

And it says Petralgas must also recognise that industrial effluents from the methanol plant must be disposed of in a manner acceptable to local authorities, communities and farmers.

It must also consider the full implications of off-site development associated with the plant, especially the pipeline and the requirement for near-wharf methanol storage.

The commission directs much of its criticism of the proposal at Petralgas' use of Alberta Gas' experience at its Medicine Hat plant in Canada as a basis in planning.

It says the company has not sufficiently appreciated the climatic contrast between Waitara's mild year-round weather and the widely varying Alberta conditions.

Petralgas has also inadequately grasped that its proposal is the first stage of gas-based petrochemical industry near Waitara, while the Medicine Hat plant was an extension to a large existing petrochemical development.

The commission considers many of the environmental issues require action by a strong and functional regional planning body.

But it says the Taranaki United Council does not have the resources to vet industrial proposals in the light of regional planning goals.

In sum, it says the environmental problems thrown up by the Petralgas plan are all capable of economic and technical solution, but require a commitment by the company to modify its proposal.

Overview

It makes a total of 32 recommendations which it says will, if accepted by Petralgas, satisfy the environmental needs of the plant.

The commission recommends that the united council should play a leading part in the environmental planning and monitoring of the proposal, and provide a regional overview.

It suggests the council should co-ordinate with Government and local agencies, and the company, to limit social disruption and get the most from benefits from the construction of the plant.

It should also establish, with the Health Department, a site for the disposal of hazardous and toxic industrial wastes from the plant.

So the council can carry out these tasks, the commission recommends that the Government should improve its staffing and funding.

Disclose

The Petralgas project is the first to be audited by the commission under the National Development Act, and it directs its recommendations towards Government departments and local authorities that will have the opportunity to advise the National Development Tribunal—the body that will inquire into the project.

The commission recommends that before the tribunal hearing, Petralgas should disclose in a public statement the progress it has made in meeting the audit's recommendations.

The statement should centre on whether the Ministry of Transport considers the flare from the plant on the approach to New Plymouth airport a major site constraint, and the result of a company investigation into a system to remove harmful chemicals from the water effluents in order to avoid direct discharge to the Waitara River or the ocean.

In regard to the specific operation of the methanol plant, the commission recommends that Petralgas reconsiders the design of the distillation relief system to lessen the amount of methanol discharged to the atmosphere.

Disturbance

It says the company should also prepare detailed plans on how a methanol spillage at the site's storage facility could be controlled.

Further study is also called for on the effects of various concentrations of methanol on plant life and animals. The commission suggests Federated Farmers should be consulted on the timing of the plant's operation to cause the least disturbance to dairy herd milking.

The Petralgas general manager, Mr R. J. Hogg, described the audit as a "positive, comprehensive report which will be studied most carefully."

He said the recommendations addressed to Petralgas "have either been acted upon already through discussion with the members of the public or statutory bodies concerned prior to the publication of the audit, or are at present under consideration."

Mr Hogg added: "Petralgas has made available very full reports concerning its proposal, and will continue to support an open approach on environmental matters that give rise to concern."

CSO: 5000

CONSERVATION GROUPS SEEK FOREST, PLANT PROTECTION

Wellington THE EVENING POST in English 28 Nov 80 p 2

[Text]

THE proposed Towns and Country Planning Amendment Bill 1980 should be extended to provide protection for native forest and plant communities and wetland areas, according to major conservation groups.

The Royal Forest and Bird Society, the Native Forests Action Council, and the Environment and Conservation Organisations of New Zealand have made submissions on the Bill to the Lands and Agriculture Select Committee at Parliament.

They all submitted that a clause relating to the preservation of indigenous forests and plant communities and wetlands and the protection of them from unnecessary exploitation and development be added to the list of matters of national importance in all planning.

"The proposed addition to the list of matters of national importance will offer a clear indication to planning authorities, tribunals and government departments that protection of these habitats should be given greater weight in the planning process," the Native Forests Action Council (NFAC) said.

The Environment and Conservation Organisations (ECO) said the addition would provide statutory safeguards that would delay logging or clearance of any private-owned forest until its conservation significance had been evaluated.

The Royal Forest and Bird Society said private forested areas did not enjoy the protection afforded by the Government's Indigenous Forest Policy that protects state-owned forests.

The NFAC, ECO and the Environmental Defence Society opposed the clause of the Bill which does away with the requirement for local authorities to publish in summary form objections to district planning schemes.

This, they said, would be a backward step that would hamper public participation in planning.

ECO also submitted that a new clause be incorporated into the Bill providing for all proposed mining and prospecting activities to undergo the full change-of-use procedure.

Mining activities as defined should be required to be accompanied by an environmental impact report.

BILL SEEKS INCREASED PENALTIES FOR RIVER POLLUTION

Opposition Party Proposal

Wellington THE EVENING POST in English 28 Nov 90 p 3

Text The Labour opposition yesterday succeeded in introducing into Parliament a Bill to increase substantially the penalties for polluting streams and rivers.

The Government did not block the introduction of the Water and Soil Conservation Amendment Bill which was drafted and introduced by Lyttelton MP Mrs Ann Hercus — the third Bill she has introduced this session.

But National MPs spoke out against the measure, which they regarded as unnecessary, and would not allow it to go to a parliamentary select committee for more detailed study.

Introducing the Bill, Mrs Hercus said its major clause, clause two, provided for the existing penalty provisions in the Water and Soil Conservation Act to be substantially increased — by a staggering 1150 percent — from the maximum penalty of \$2000 to \$25,000.

Another clause made adjustments to penalties for offences against the trade waste bylaws contained in the Local Government Act.

These penalties should go from the present maximum of \$1000 to \$5000, Mrs Hercus said.

"It is no exaggeration to say that every New Zealand

river on which a town or city is situated has a pollution problem of some degree — and in some cases, regular, consistent and highly damaging pollution," the Christchurch MP said, using the Heathcote and Avon Rivers as examples.

She was aware that the Water and Soil Conservation Act and other associated legislation was under review but this was well overdue and the issue of increasing penalties could be dealt with separately.

The present level of penalties, Mrs Hercus said, was clearly just not sufficient to inhibit polluters.

Education

But the Minister of Works and Development (Mr Bill Young) described the proposal as a piecemeal measure which would not solve a problem for which education was the answer.

"It is a piecemeal approach to a major problem and that problem will be tackled when the revised Act

comes before the House," the Minister said.

In addition, the measure would not cover oil discharges which were covered by the Marine Pollution Act of 1977.

Western Hutt MP Mr John Terris (Labour) spoke out strongly for the Bill.

Pointing to the polluted Waiwhetu Stream in the Hutt Valley, Mr Terris said one of the most effective ways of educating the public was to provide specific penalties, increased where appropriate.

Carpet

He had seen floating in the Waiwhetu Stream an old carpet, and a discarded plastic lid, and believed that example of an extinct waterway — "a stinking mess" — was due to Government inaction.

Although it allowed the Bill to be introduced, the Government voted against it being referred to a select committee for further study. It has been set down for second reading.

Passage Seen Unlikely

Christchurch THE PRESS in English 29 Nov 60 p 12

[Report by Parliamentary reporter]

[Text]

An attempt by the member of Parliament for Custerion (Mrs Ann Hercus) to bring about higher penalties for pollution of streams and rivers was only partly successful on Thursday.

She successfully introduced the Water and Soil Conservation Bill but failed to have it referred to a select committee. Accordingly, although the bill has been put at the bottom of the Order Paper for a second reading, this is unlikely to happen before the end of the session and the bill will probably lapse.

The main effect of the bill would be to increase the fine for pollution of waterways from the existing maximum of \$2000 to a new maximum of \$25,000. It would also make a similar adjustment to the penalties for offences against trade waste by-laws contained in the Local Government Act) from the present maximum fine of \$1000 to \$5000.

Introducing the bill, Mrs Hercus said pollution of water had increased dramatically.

"It is no exaggeration to say that every New Zealand river on which a town or city is situated has a pollu-

tion problem of some degree, and in some instances regular, consistent, and highly damaging pollution," she said.

The review of the act and associated legislation which was now underway as taking a long time without producing anything, she said.

"We have waited patiently for more than a year, and there is still nothing. We can wait no longer. The issue of increasing penalties stands alone and does not affect or impinge on other areas of possible reform in this area."

Mrs Hercus said that existing penalties, and the level of fines imposed, were "clearly just not sufficient to inhibit polluters, particularly those who regularly pollute our rivers and streams."

Using Christchurch's problems as an example, Mrs Hercus gave a sample list covering 16 months of pollution incidents in the Avon River and Heathcote River.

February, 1978: oil leaks into the Avon.

April, 1978: chemical leaks into the Avon and the Wairarapa Stream during which hundreds of trout died.

July, 1978: oil leaks into the Avon.

August, 1978: oil leaks into the Heathcote, hundreds of ducks die.

September, 1978: oil leaks into the Heathcote.

September, 1978: creosote leaks into the Heathcote.

October, 1978: diesel leaks into the Avon.

December, 1978: tar substance from a brewery escapes into the Avon.

January, 1979: tar escapes into the Heathcote.

March, 1979: oil leaks into the Avon.

May, 1979: 12,000 litres of oil escapes into the Heathcote, killing hundreds of ducks and other wildlife.

"Some of the polluters are consistent offenders. The Christchurch Gas Company is up to its eleventh or twelfth conviction," said Mrs Hercus.

"The damage done is often irreversible. The nub of my argument is that a fine of \$300 or \$400, which seems to be the average level imposed after successful prosecution, is clearly just not a realistic and successful deterrent."

"That sort of fine is clearly regarded as 'peanuts', and polluters just go on, polluting and having peanuts," she said.

CSC: 5000

PARKS BILL TERMED LICENSE FOR OPEN-CAST MINING

Wellington THE EVENING POST in English 28 Nov 80 p 3

/Text/ The National Parks Bill was nothing more than a fast track for open-cast mining development, Labour claimed in Parliament last night.

The allegation came from Auckland Central MP Mr Richard Prebble (Labour) during a more than six-hour debate in committee of the much disputed Bill.

Debate last night was a stark contrast to the Bill's uneventful second reading in the House at approximately midnight on mini-Budget night Tuesday.

Examination of legislation in committee enables Parliament to take a detailed look at each clause, and this is pretty well exactly what the Labour Opposition forced the Government to do last night.

In general, the Opposition party is dissatisfied with the substantial changes the Government has already made to the Bill, which has attracted widespread criticism from national park users and others.

Particular clauses the Opposition fought unsuccessfully in the House last night to have changed were:

- Clause 14 providing "amenities areas" within parks for public use.

- Clause 16 governing the constitution of the National Parks and Reserves Authority.

- Clause 30 covering the membership of the National Parks Boards.

- Clause 41 setting out that the Department of Lands and Survey is to manage and control national parks.

Labour backbencher Mr Richard Prebble claimed that the basic purpose of the Bill was for the Government to gain control of the National Parks but that no good reason had been given for this.

"This Bill is nothing more than a fast track for mining development," he said.

Open-cast mining in the parks was a very real possibility and if Labour had taken the step in Government it would have been labelled as "arrogant socialism," Mr Prebble said.

Criticising the extent of the department's powers as set out in the Bill, Christchurch Central MP Mr Geoff Palmer asked why there was

a need for centralisation of such a power in Wellington.

"These national parks boards will remain effectively under the thumb of the department," he said.

But, Lands Minister Mr Venn Young countered with the statement that: "The heavy hand of Government won't come down on a national parks authority which doesn't accede to the Government's request on the appointment of members."

On the mining question, the Minister said the rights to mine in national parks would remain exactly as they are under the present legislation.

He reasserted that the principle of the Bill was to integrate administration of national parks, linking them where necessary throughout the country.

The legislation was also intended to avoid unnecessary duplication of effort by the boards and the department.

The Bill passed its committee stages with amendment at 11.30pm.

ELIMINATION OF POLLUTION URGED

Karachi MORNING NEWS in English 16 Dec 80 p 4

[Editorial]

[Text]

AS a by-product of the modern age, the environmental pollution is a universal problem but it is assuming more menacing proportions in the under-developed countries. In these regions, industrial development is taking place at a fast speed in specified locations, naturally attracting huge population which cannot possibly be controlled. All major cities in Pakistan are facing, on this account, the problem of environmental pollution but the worst hit in this respect is Karachi. Nearly 10 per cent of the country's total population is concentrated here within a limited space. Added to these are the lakhs of automobiles, most of which are either smoke-emitting or noisy. Fresh or pure air is practically out of question under these circumstances. Contaminated water and adulterated food make the problem more acute and menacing. There is hardly a dweller in Karachi who is totally free of any physical ailment. According to a survey conducted some time ago, nearly 12 per cent of the Karachiites are susceptible to heart disease. No wonder it is so. The other big cities in the country must be facing similar problems although on a smaller scale.

It is gratifying that the Government has taken serious notice of the rising menace of environmental pollution and has initiated measures to combat it. It was with a view to assessing the situation properly that a seminar was held in the city in June last which appointed 14 experts' committees to make a detailed study of the problem and suggest remedial measures. The committees, which were asked to complete their task by Dec. 31, will present their reports to the provincial Governor, Lt. Gen. S.M. Abbasi, in the first week of January. It is expected that after submission of the reports, practical steps to control the menace will be initiated.

Among other things, the committees were asked to prepare action programmes relating to waste water and its recycling, industrial and maritime pollution, garbage disposal, drinking water supply, pollution due to use of asbestos pipelines, public health hazards, education on environment, etc.

It is for the first time that serious efforts are being made to assess the magnitude of pollution through various sources. The suggestions of experts is keenly awaited by every body, as it concerns directly the physical and mental happiness of all of them. Nobody in Karachi is 100 per cent fit, and for no fault of his own. He does not have pure air to breathe, pure water to drink and pure food to eat. It is a dismal picture indeed. Our forefathers might look primitive by our standards of living, and the thousand-and-one "good things" of life we now enjoy, but they were luckier in many respects. They at least had pure things to breathe, drink and eat. Being nearer to the "state of nature", they actually partook something of the virility of Nature itself. The host of diseases afflicting mankind in our modern and civilised age were practically unknown then.

It would be pertinent to mention here that a lamentable lack of civic sense among the people is partly responsible for the pollution. It is specially so in Karachi. Most of the smoke-emitting vehicles belong to private corporations or individuals who do not care to get them repaired because they can get away with their lapse. Apart from this, there is the general habit of throwing dirt and garbage outside the houses or wherever they find a space to dump it. Spitting and easing themselves at wrong places is yet another bad habit which gives the city a shabby and filthy look and contributes to the general mass of pollution.

The elimination, or even partial control of the pollution, will bring about a qualitative change in life in the urban areas in the country. With all the fumes from the automobiles, the bacterial and chemical infection due to dirt and filth in the city and the contaminated water, the situation in Karachi is something akin to slow poisoning. What it means in terms of physical and mental health, to live in a pure atmosphere can be appreciated by having a look at the sturdy physique and cheerful outlook on life of rural dwellers who breathe fresh air, eat pure things and drink sweet and uncontaminated water. Compared to them, the poor city dweller is but a sick man.

It must be pointed out here that not all the environmental problems are that difficult to control. The air pollution is largely the result of smoke-emitting vehicles which can be easily controlled just by enforcing the relevant traffic and vehicular laws that are already there and need simply to be

enforced. Similarly, if the municipal corporations did their job of looking after sanitation properly, another major source of pollution would have been removed. Contamination of water can be removed if the concerned authorities take care to do their job efficiently and honestly. Indeed, with a tight administration, half the battle will have been won. Experts should be left to take care of the rest.

The problem of solid waste from the industries and residential areas is a permanent and difficult phenomenon to tackle and it will require a comprehensive plan. The suggestions made by the relevant committee in this connection are not yet known but we are sure the measures adopted in other parts of the world, similarly situated, will have been taken into consideration by the experts. Steps recommended are awaited with interest.

CSO: 5000

CHEMICAL POLLUTION OF ENVIRONMENT ANALYZED

Beijing HUANJING BAOHU [ENVIRONMENTAL PROTECTION] in Chinese No 5, 1980 pp 1-4

[Article by Qu Geping [2575 2706 1627]: "Major Impending International Environmental Questions--Poisonous Chemical Products in the Environment"; first of a series]

[Excerpts] Editors' Note: Environmental pollution and damage are one of the greatest challenges now facing mankind. Many environmental questions transcend one area or one country, have become world problems, have attracted great attention from world public opinion, and have become important topics of discussion by international organizations. What are these critical international environmental problems? This journal requested former Chinese permanent representative to the United Nations Environmental Planning Office Comrade Qu Geping to contribute an article giving an introduction to some of these circumstances; this will be printed as a series for our readers.

The food and drink of this country's urban and rural inhabitants is mostly produced by households; the foodstuffs industry is still insufficiently developed and the quantities of additives included in food and absorbed by people are still small. However, during 10 catastrophic years, because of breakdowns of management and control, certain problems arose in the production and use of chemical food additives. On the basis of incomplete statistics from 1974, 267 chemical food additives were used in 500 foodstuffs, including many cases of abuse. For example, some non-food dyes were used as food colorings, in some cases ammonium sulfate agricultural fertilizer was actually used to prepare red-brown food coloring, and some poisonous microorganisms caused great harm to health; some forbidden chemical additives came into use, as for example rongalite, which has caused great harm to health, and has long been forbidden, but which in some cases has come back into use; in some cases quantities used exceeded standards by several times, several dozen times or even more than 100 times. In addition, foodstuffs were contaminated with agricultural pesticides, industrial wastes, mold, heavy metals, epidemic diseases of domestic animals and pollutants from processing, transport and packaging, as well as contaminants carried by imported foodstuffs. In order to improve this chaotic state of affairs, in 1974 the state set up the National Food Hygiene Leadership Group, which in turn set up offices and issued a series of regulations to prevent contamination of foodstuffs. In particular, in 1979 the

State Council issued the "People's Republic of China Food Hygiene Management Regulations," which further improved the system and the laws and regulations pertaining to this country's foodstuff hygiene work. In recent years, under the leadership of the National Food Hygiene Leadership Group, and through the efforts of the relevant departments and localities, great changes have occurred in the status of our country's food hygiene. However, as the food industry develops and the people's mode of life improves, the quantities of food additives may increase constantly, and accordingly intensified management and control of the dangers involved should be put on the agenda.

Our country has just begun to use the factory method of livestock raising, and the quantities of chemical medications are still limited. But as our livestock factories go into larger-scale production, veterinary medications and chemical feed additives will be used in increasing quantities, and the question of how to control their dangers should become another new environmental topic. The large-scale use of chemical fertilizers has had a major effect in producing large increases in food stuff output. But at the same time, certain associated environmental questions have arisen.

At present, more than 100 million metric tons of agricultural fertilizer are used worldwide every year. The use of chemical fertilizers has resulted in changes in the physical properties of soil, has decreased fertility and has polluted or negatively affected the quality of agricultural products. The nitrates formed in the soil when ammonia fertilizers are used are absorbed by plants, can enter the human body, can lead to hemoglobin disorders and can produce the carcinogenic nitrosamines. The quantities of chemical fertilizer absorbed by crops are very small, while most of it is carried by rain and percolation into streams, lakes and the oceans, resulting in nutrient pollution of water bodies. In addition, the large quantities of nitrogen oxides produced by the decomposition of nitrogen fertilizers are thought to be an important factor in breaking down the density of the ozone layer; a decrease in the density of the ozone layer can lead to an increase in human skin cancer.

The amounts of chemical fertilizer which we apply are in general too high. In some cases they are used in combination with farmyard manure, which does not produce any visible environmental damage. However, problems have appeared in certain areas; these include especially: (1) Waste. If every year we use 30 million tons of chemical nitrogen fertilizer, the quantity actually absorbed by the plants is less than 13.5 million tons, and 16.5 million tons is lost by volatilization, washing away on or below the surface, or nitrification or denitrification, becoming factors harmful to the environment in particularly large quantities. (2) Large-scale application of nitrogen fertilizers has resulted in an imbalance between nitrogen, phosphorus and potassium, so that the physical and chemical characteristics of the soil are degraded. It has been reported that the nitrogen content of the soil in the Taihu Lake area is 1,500 parts per million, while the immediately available potassium content is generally about 70 ppm and that of immediately available phosphorus less than 10 ppm. Crops absorb the nutrients nitrogen, potassium and phosphorus in a certain proportion, and if one of them is in insufficient supply, certain symptoms will appear during growth, damage by harmful insects will be increased and production will suffer. (3) Rural fuel is in very short supply, and large quantities of stalks have been burned; since they have not been returned to the fields, the organic matter content of

the soil has decreased, and large sources of fertilizer have been wasted. The nitrogen content of the stalks is about 0.5 percent, the phosphorus content about 0.2 percent and the potassium content about 1.4 percent. If every year 500 million tons of stalks are burned, this results in the burning of 2.5 million tons of nitrogen, equivalent to 12.5 million tons of ammonium sulfate and 1 million tons of phosphorus, equivalent to 5 million tons of calcium phosphate. If potassium is returned to the fields in the ashes, it will not be lost. The nitrogen burned becomes nitrogen oxides, and the phosphorus becomes phosphorus pentoxide, both of which are air pollutants.

Of the heavy metals, cadmium, mercury and lead are the pollutants which cause the most extensive harm and are the most poisonous. A typical form of chronic cadmium poisoning is "bone ache disease," in addition to which it can also lead to lung and kidney disease, so that it presents a great threat to health. In certain regions of this country, the cadmium content of the soil and of paddy rice is increasing; a striking example is the Zhangshi Irrigation Canal. In rice paddies which have been irrigated with cadmium-containing wastewater, the paddy rice cadmium content in severely polluted sections averages 1.09 mg/kg, while in sections of moderate pollution it is 0.48 mg/kg and in sections with mild pollution 0.19 mg/kg. This pollution is serious, but no data on the effects on human health have yet appeared, possibly because of the short time period involved, or because the accumulations may not have yet reached a disease-causing level, or because the cadmium-containing rice may be eaten mixed with noncontaminated rice, resulting in dilution, or because cadmium contamination disease symptoms already exist and have not been discovered or have not been generally recognized.

Owing to the fact that in recent years nonmercury-containing instruments have been used, the quantity of mercury discharged in this country has been decreased. But because the amount consumed in industry is high, and it has been discharged and has accumulated over many years, mercury pollution has not been alleviated. In particular, the mercury pollution in Songhuajiang River No 2 is particularly grave; the mercury content of fish averages 0.74 mg/kg, so that the mercury levels in fishermen have already reached the lower limit of those found in poisoning victims in Minamata, Japan. There is still disagreement about the health hazard posed by mercury: one opinion holds that chronic latent methylmercury poisoning (suspected Minamata disease) has already occurred; another opinion holds that it is still only chronic latent methylmercury "effects." It appears that everyone admits that harm has occurred, and the difference of opinion concerns only the degree of harm.

Although there is a wide variety of chemical products with a far-flung range of uses, it is only necessary to set up a registration system, issue regulations and standards, and carry out strict management in order to be able to control their possible environmental effects. Poisonous chemicals registration and management work in this country has been entrusted by the government to the "poisonous chemicals recording stations" of the Institute of Public Health of the Academy of Medical Sciences, which will undertake the heavy responsibility of managing poisonous chemical products in order to make a contribution to environmental protection.

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CSO: 5000

BEIJING INDUSTRIAL DEVELOPMENT DISCUSSED IN TERMS OF POLLUTION

Beijing HUANJING BAOHU [ENVIRONMENTAL PROTECTION] in Chinese No 5, 1980 pp 5-7, 11

[Article by Zhu Zuxi [2612 4371 1585]: "A Discussion of the Development of Beijing's Industry in Terms of the Current State of Environmental Pollution"]

[Text] In the 1950's, when the effects of environmental pollution were continually making themselves felt in some industrially developed capitalist countries, Beijing still maintained pure, fresh air, pure water sources, and quiet surrounding. Foreign friends who traveled here all praised and admired Beijing's excellent environment. But as time passed, Beijing's environmental quality has continually deteriorated. The air has become hazy and dusty, the city has overflowed with polluted water and the noise of vehicles has become clamorous. Foreign friends who came to Beijing have constantly made unfavorable comments. Some of them have said: "I have visited dozens of cities throughout the world, including Third World cities, and I have never seen a city so seriously polluted as Beijing."

The inhabitants of Beijing also made many complaints about this situation and requested that the "three wastes" be disposed of and the environment improved.

1. In the last 30 years Beijing has developed from a city with very little modern industry into a metropolis with fully developed industrial sectors as metallurgy, machine building, chemical engineering, light industry and textiles, building materials and electrical instruments.

But the rapid development of industry and the sharp increase in population have brought Beijing a number of problems: housing is scarce, traffic is congested and the city's environment is daily deteriorating, particularly as a result of air pollution, water resource pollution and noise pollution and can be said to have reached an extremely grave level. Currently every year the burning of coal in Beijing emits as much as 500,000 tons of sulfur dioxide and ash into the atmosphere, and particularly during the heating season the city is full of smoke. If you look at it from Xishan hill in the suburbs, the entire city is covered by a gray cloud of smoke. According to readings by the relevant departments, the SO₂ content of air in the urban area constantly exceeds state standards severalfold, and the content of 3,4-benzpyrene is several times or several dozen times as high as in clean comparison areas, and the average quantity of dust deposited is generally several times higher than in the reference areas. But fuel consumption in Beijing is still increasing rapidly. Some people believe that if radical

policies and treatment measures are not adopted in the next few years, fog situations comparable to those in London could occur in Beijing.

Harmful waste gases in the atmosphere not only harm the people's physical and mental health, but also harm our cultural heritage. It has been reported that the white marble reliefs and copper lions and turtles exposed to the elements in the Imperial Palace and Imperial Ancestral Temple have already been corroded by acid fog, and the contours of the reliefs are becoming less and less distinct.

Beijing's subsurface water resources have already been excessively exploited, and for many years the subterranean water table has been dropping constantly in the nearby suburbs and industrial areas, while its hardness has been constantly on the rise. The area in which underground water resources have hardness exceeding state standards is already several hundred square kilometers, while the main drinking water sources in the urban area have been rapidly deteriorating and water quality declining year after year. Some people estimate that if the situation continues, by the year 2000 Beijing will experience a serious water shortage. Not only that, but Beijing's subsurface water sources are also being polluted by the three wastes. At present every day nearly 2 million tons of wastewater that has not been effectively treated is discharged into the environment, and many surface water courses have already become froth-covered, polluted, stinking "dead streams" where fish and aquatic life have disappeared. Some people say that in the early 1950's Beijing built one Longxu Ditch, but now there are dozens of Longxu ditches. In the last few years, many water wells have had to be closed up because of pollution, and environmental pollution incidents have occurred from time to time; it is roughly estimated that every year the total economic loss resulting from pollution problems amounts to several hundred million yuan.

Beijing's noise pollution is also rather serious. It is generally believed that the noise level should be less than 30-50 decibels when people are sleeping, and when they are working, conversing or thinking it should be between 45 and 60 decibels. But on the main traffic arteries inside the city the noise level is as high as 75 dB (it is 58 in Tokyo), and in many scientific research organizations, office buildings, conference halls, schools and residential districts near these arteries it is impossible to work, study or rest properly owing to the serious disturbance. Even the birds cannot stand the polluted environment and the roar of noise: birds have almost disappeared inside the city.

Such circumstances are extremely unsuitable for Beijing, the capital of socialist China.

2. The factors producing this grave environmental situation are varied, but we believe that the main ones are as follows:

A. Too wide a variety of industrial development, with an excessive predominance of heavy industry.

It has been clear from the day on which New China was founded that Beijing is the capital of our country and the country's political center. But Beijing's economic function, i.e. its economic position in the country as a whole and in North China, has never been made entirely clear; only the general suggestion to "make a consumer city into a producer city" has been made. As regards industrial

development, a one-sided stress was laid on "taking heavy industry as the foundation," and at the end of the 1950's it was also proposed that a complete industrial system with a fully developed complement of such sectors as metallurgy, machine building, chemical engineering, coal, textiles and precision instruments be created.

Examining industrial investment over the last 30 years as a whole, we can see that heavy industry has accounted for about 90 percent. In the early 1970's it actually accounted for more than 95 percent. In terms of total industrial output value, heavy industry's contribution of 64.5 percent exceeds the figures for both Shanghai and Tianjin and is second only to that for our country's heavy industrial city, Shenyang.

Heavy industry, and particularly metallurgy and chemical engineering, not only take up large amounts of space and consume much energy and water, but in addition are also serious polluters of the environment. Of the coal consumed every year in Beijing City, the Shougang steel works, the Yanshan Petrochemical Corporation, the coking plant and the power plant account for more than half. Of all the water used in Beijing, industrial-use water accounts for 81 percent, and the metallurgical, chemical engineering and electrical power departments account for more than half of industrial-use water citywide. For every 10,000 yuan of output value, energy consumption is 0.2-2.7 tons (of standard coal) for light industry and 20-50 tons for heavy industry; water consumption is 300 tons for light industry and 1,000 tons for heavy industry.

This state of affairs not only puts the proportionality between light and heavy industry out of balance, but also has brought a series of problems such as air pollution, water sources pollution, excessive exploitation of subsurface water, and a scarcity of transport to Beijing, which lacks energy resources and water resources in the first place.

B. Placement of industry is insufficiently rational.

Since Liberation, Beijing has created 10 industrial districts, including the 2 banks of the Tonghui River, the eastern suburbs, the southern suburbs, Shijingshan, Jiuxianqiao and Shihua. However, several plants which take up large areas, consume large quantities of energy and water and are serious polluters have been located in districts which are not far from the center of the city. The near suburbs of Beijing account for only a few percent of the total area of the city, but 80 percent of industry is concentrated in them. This is the main factor producing atmospheric pollution and excessive subsurface water resource utilization in the city.

According to statistics from the relevant departments, every year the actual quantity of water utilized in Beijing's nearby suburbs exceeds 50 percent of the total amount that can be extracted. On the average, in certain industrial areas in the eastern suburbs there is an average of 23 wells per square kilometer, twice as high as the normal figure, resulting in a rapid drop in the water table. Subsurface water subsidence funnels have already formed over an area of several hundred square kilometers, and surface subsidence has also occurred.

Observations indicate that both in high summer and in early autumn, and both day and night, the air temperature in Beijing city is generally 1-2° higher than in

the suburbs; this is the so-called "heat island effect" in climate. When the heat islands reach a certain strength, centripetal air vortices may begin to flow toward the city from all directions, and the smoke and ash emitted by plants located in the nearby suburbs can be concentrated in the center of the city by the vortex winds, making air pollution in the city even more serious.

Some chemical plants are located in areas where subsurface water resources are plentiful or in the cultural and educational districts, and some of them alternate with residential districts, so that some of these areas suffer serious environmental pollution.

C. Too-rapid growth of urban population..

In the last 30 years, the population of Beijing City has increased from 1.6 million to a current 5 million, and the population density is as high as 14,700 (per square kilometer), higher than in Paris, London or Moscow. One important reason for the rapid increase in Beijing's urban population is excessively fast development of industry, particularly heavy industry. In 1949, there were only 156,000 industrial staff and workers in Beijing, while by 1979 there were already 1.33 million (not including the construction industry, posts and telecommunications and the like). In the last 10 years, although the natural rate of increase of Beijing's population has decreased somewhat, the mechanical rate of increase is still on the rise. A rough estimate has been made that in the 3-year period 1977-1979 there was a net increase of more than 400,000, and the increase in the first half of 1980 is already several tens of thousands. The population explosion has increased the already great pressure on the city in many areas, traffic is congested, housing is scarce and the environmental quality is deteriorating constantly.

3. Experience shows that in industrial development it is only by thoroughly bringing into play the advantages of the location, stressing strong points and avoiding weak points, that it is possible to obtain the best economic results.

The total area of Beijing City is 16,800 square kilometers, of which only a third is flat. Land area is limited, energy and water are insufficient, mineral resources are lacking and transport conditions are unfavorable. However, for many years, an overstress on the rate of increase of industrial output value, on evenly developing a full complement of heavy industry sectors and on a complete industrial system has produced the abovementioned evident consequences, much as a person's shortcomings might be revealed.

Recently the Central Committee Secretariat made four suggestions regarding urban construction policy for Beijing. We believe that these four suggestions were made on the basis of a summarization of the capital's construction experience, with a new recognition of the capital's characteristics, and in keeping with Beijing's specific conditions, including the geographical surroundings, natural resources, historical development and the actual state of affairs. They have set a correct direction for future urban construction in Beijing.

We believe that to build Beijing into a first-class city which is politically stable, environmentally clean and attractive, scientifically and culturally developed and economically flourishing, we must make a major resolution to readjust industry in the city.

A. Readjust the investment proportionalities, alter our industrial structure, and control the scale of industrial development.

The expansion of heavy industry must cease, and the scale of industries which occupy a large area, consume large amounts of energy and water and cause serious pollution must be controlled. For historical reasons, the Shougang Steel Corporation is located on the upper reaches of Beijing's water supply, which is unreasonable placement. For many years Shougang's size has not been fixed; when the amount of iron produced has been greater than the amount of steel refined, steel refining has been increased, and when there has not been enough iron, iron production has been expanded. The result is that Shougang has been continuing to grow. Currently Shougang has become one of the units which occupy the most land and consume the most energy and water, as well as the worst polluter in the western suburban region. We believe that in the future Shougang should not be expanded within Beijing, and that it must concentrate on innovation and latent potential. Consideration should be given to a planned transfer of the steel refining segment to the place where the raw materials are produced, Qian'an, Hebei Province, while the fuel can be supplied from Tangshan, which is not far away. The Beigang Steel Plant, which is located within Beijing City, is not only a heavy user of water, but regularly pollutes the city with dense smoke, and from the point of view of long-term development the question of moving it should be considered.

At present the Yanshan Petrochemical Corporation brings oil a great distance from Daqing oilfield in Heilongjiang Province or Shengli oilfield in Shandong to be refined into chemical products in Beijing. Its current 300-ton ethylene installation and other associated facilities are already very large. They not only produce serious air and subsurface water pollution in the district in which they are located, but in addition are bringing in water from several dozen kilometers away for production use. If another 300-ton ethylene installation is added, it is not hard to guess what the consequences will be. But as far as the current situation is concerned, we believe that they should "stop where they are."

B. Designate water resource protection districts and stringently protect water resources.

Hereafter, new polluting plants should not be built in water resources protection districts or near the upper reaches of water sources. Existing plants which are serious sources of pollution and cannot manage it must, depending on the situation, be closed, cease the type of production in question, be combined, change their production or be relocated. Those whose product generally does not serve this city and which pollute water resources must be resolutely closed down.

The Yongding River alluvial fan is one of the city's richest subsurface water resource areas, and most of the wells that supply the city with water are located there. But for historical reasons, many iron and steel mills and chemical engineering plants which produce serious pollution are located here. Because a certain agricultural pesticides plant in the southern suburbs had poor management during the production process, resulting in evaporation, emission, leakage and percolation, production accidents resulted in serious pollution of the neighboring subsurface water sources. Of 12 wells at a nearby water works, 4 began to smell because of pollution and could not be used for drinking water, so that it was necessary to abandon them. With plants of this type it is necessary to take

decisive steps and resolutely close them down to assure that subsurface water resources will not continue to be polluted.

Furthermore, the Miyun Reservoir is currently an important source of water for Beijing and Tianjin. This water source, which the people call the "water of life," must be stringently protected. Upstream of the reservoir and in the areas around it stringent control should be instituted, and building of new plants which cause pollution, the expansion of existing ones or relocation from elsewhere should not be allowed.

C. Control the size of the city, and give comprehensive consideration to placement of industry in the city.

Because of expansion of production activities and continuing increase in the size of industrial enterprises in Beijing City, the city is becoming more and more congested, plants and residential areas are overlapping each other, and environmental pollution is daily becoming more serious, with the result that planned readjustment of industry within the city can brook no further delay.

There are currently 700 plants of different types in the central part of Beijing, of which 80 percent alternate with residential districts, so that harm from the 3 wastes and noise and vibration seriously threaten the inhabitants. For example, a certain electroplating plant in the eastern part of the city consumes more than 60 tons of chlorine compounds a year, and not only have wells in its vicinity been polluted, but the water sources of the water company are already being threatened; again, a certain foundry which primarily produces blanks has gravely harmed the surrounding environment with its smoke and ash.

We believe that placement of plants in the central part of the city should be subjected to specific analysis on the basis of Beijing City's urban nature. Industries which cause serious pollution, whose noise and vibration seriously disturb people, which present a danger of fire or explosion, or which primarily process agricultural sideline products in the service of agriculture should be readjusted group by group and at different times. Plants whose main products are processed for other provinces or cities and which pollute the surrounding environment should be resolutely shut down. If the city's industrial production direction is made increasingly stable and placement is made more rational, the environment will be improved.

D. Take advantage of strong points, avoid weak points and thoroughly bring Beijing's advantages into play.

Beijing is our country's scientific and cultural center, and the country's highest scientific research organizations, and advanced scientific educational institutions and personnel are concentrated here. If this advantage is thoroughly brought into play and light textiles, foodstuffs, special crafts, printing, precision instruments and other industries which take up small areas, require a concentration of knowledge, consume small amounts of energy and water, require little transportation and have little or no pollution should be selected for development in the direction of high-quality and precision.

Beijing is also our country's ancient cultural capital, and one of the cities with the most ancient buildings and famous antiquities; we should thoroughly

identify and utilize Beijing's natural scenery resources and famous antiquities and energetically develop the "smokeless industry" of tourism and the special handicraft, light textile, foodstuffs and other industries which serve it.

2. Prevention should take precedence over treatment, and newly constructed plants or relocated industries must be subjected to advance environmental evaluation.

The United Nations Environmental Planning Office is energetically promoting "ecological development," under which the speed of economic development and the placement of plants in cities should conform to ecological laws. Beijing's 30 years of experience in industrial development also proves that comprehensive planning, rational placement and rational development and utilization of natural resources is the main way of protecting the environment and preventing environmental disasters. However, past plant siting has generally been insufficiently rational, has been subjective and arbitrary, and has lacked a comprehensive analysis of the objective conditions. The Yanshan Petrochemical Corporation is a rather typical example. In the last few years, people have continually advocated building a new large cement plant with an output of several million tons a year in the Shisanling Reservoir scenic district; others sited a machine building plant in a river valley, so that when mountain floods occurred the plant's buildings and equipment were ruined, with the loss of several million yuan; in addition, relocation was originally done in order to decrease pollution and improve the environment, but on the basis of the situation a few years ago, many plants were relocated primarily in order to shift pollution.

We believe that in order to escape from the current passive situation with regard to environmental protection, we should make advance environmental evaluation work an institution within economic development. No construction certificates should be granted by the planning departments to plants which have not undergone advance environmental evaluation, the design departments should not do design work for them and the banks should not allocate them funds.

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CSO: 5000

LINKING OF INDUSTRIAL DEVELOPMENT, ENVIRONMENTAL PROTECTION URGED

Beijing HUANJING BAOHU [ENVIRONMENTAL PROTECTION] in Chinese No 5, 1980 pp 12-14

[Article by Liu Hongqi [0491 3163 1477]: "Protecting the Environment and Developing Production"]

[Text] Environmental questions affect man's existence and development. When we develop production we must respect ecological laws and give attention to environmental protection.

The rise and development of environmental questions is intimately connected with the process of development of production. For example, the quantities of chemicals released into the environment by human productive activity are several hundred times as large as those released by volcanoes and rock weathering. Currently, of the world's 4.5 billion people, 40 percent live in cities, and most industrial enterprises are also located in cities and towns, where every year they discharge large quantities of the "three wastes." The total quantity of wastewater discharged is several hundred billion cubic meters, solid waste amounts to about a billion tons, and various aerosols also amount to about a billion tons. Large-scale discharges of the "three wastes" involve an immense secondary cost in pollution. It is reported that between 1971 and 1976 United States losses resulting from pollution by the "three wastes" alone amounted to 300 billion dollars, of which losses produced by air pollution accounted for 32 percent, losses produced by liquid wastes for 26.5 percent and losses caused by soil and solid wastes to 41 percent.

Since the First National Environmental Protection Conference in 1973, all the localities have engaged in extensive propaganda and have set up organizations and pursued environmental protection work, achieving considerable results. But as the economy has developed, because knowledge of the ecological viewpoint is limited and treatment measures are still subject to technological and economic limitations, especially during the turmoil of the last 10 years, environmental pollution has become increasingly serious. Currently more than 70 million tons of wastewater alone is discharged every day, most of it wantonly and without treatment, so that water sources have become seriously polluted. A survey of subsurface water resources of 44 cities indicates that 41 of them are suffering from pollution, and many of them have concentrations of harmful substances exceeding drinking water standards. Currently this country relies for energy primarily on coal, and consumes 600 million tons a year; it produced 120 million tons of coal ash, 20 million of flyash, and 12,000 tons of sulfur dioxide last year,

seriously polluting large and medium-size cities and towns throughout the country. Industrial areas suffer particularly from smog, and almost all cities have dust deposition levels exceeding standards. The various industries throughout the country produce about 400 million tons of coal slag a year, and the comprehensive utilization rate is very low.

In the last 10-odd years, because our country has deviated from ecological laws in developing production, cases of deterioration of environmental quality have become common. Consider, for example, the world-renowned Guilin mountain scenery, and the splendid scenery on the banks of the Lijiang River: every day more than 100,000 tons of industrial and domestic wastewater is discharged there; of 300 smokestacks, 70 percent do not have smoke and ash removal; and dumping and discharge of coal slag have produced serious pollution of water and the atmosphere. Now oil floats on the water of the rivers, the water is turbid, the mountain rocks have turned white, plants are withering and while in the past Guilin's scenery was the most beautiful in the world, currently it is suffering from pollution. The Suzhou parks, a "heaven on earth" which attracted many, in the last 10 years have been so polluted as a result of unreasonable placement of industry and wanton discharge of the three wastes that the "heaven" is completely disfigured. In recent years, owing to construction of plants around it and direct discharge of domestic and hospital wastewater into it, Suzhou's pearl, West Lake, now has smaller numbers and fewer varieties of plankton, algae have begun rampant growth, suspended matter has increased, the lake water has become oxygen-impooverished, and the water ecology has undergone an abrupt change.

In carrying out industrial modernization, the developed capitalist countries went through a stage in which pollution was followed by treatment. We should analyze the lessons of their experience; we must not take the tortuous path that capitalism has taken in environmental protection.

Protecting against and eliminating pollution and protecting and improving the environment are an important condition for carrying out the four modernizations and an important aspect of socialist modernization. The problem of environmental pollution is manmade, and accordingly it must be solved by man. Currently, in order to solve the problem of environmental pollution by our country's industrial production, we suggest that the following main points be grasped:

1. Development of production and environmental protection must be coordinated.

The purpose of social production is to continuously satisfy the people's growing material needs, and in order both to expand production and to be able to protect the environment we must have not only a production viewpoint but an environmental protection viewpoint as well, and must establish firmly in our thinking the dialectical realization that "in expanding production we must devote attention to environmental protection, and environmental protection is aimed at expanding production better." Factory placement and size, process policy, equipment types and process regulations all must take account of environmental protection needs. The expansion of production by enterprises should not focus only on carrying out production tasks but also should take on the social task of environmental protection. Whether or not the relationship between development of production and environmental protection is harmonious is a strategic question of economic construction. If the proportionality between agricultural, light industrial and

heavy industrial production becomes out of balance, our country's experience of socialist construction is that it can be set right by 10 or more years of effort; but if the environment is disrupted, it takes several decades, or an even longer time, and a rather high price for it to recover. Accordingly we must realize that good production work is aimed at improving the people's current standard of living, while good environmental protection work involves mankind's long-term interests or even the major question of whether or not he can exist.

2. Utilize strong points and avoid weak points, bring advantages into play, strengthen environmental protection management.

At present some countries are making rather large investments in order to solve the problem of environmental pollution. For example, every year the United States expends about 2-2.5 percent of the U.S. gross national product to prevent and treat pollution. In 1975, the Japanese investment in environmental protection was 2 percent of gross national product, and 7 percent of total industrial investment. In the last 10 years, the United States' annual equipment investment for treating pollution was 7 billion dollars. In the near term our country cannot have large funds for environmental protection investments, and accordingly we must base ourselves on this country's actual situation, accentuate the strong points and avoid the weak points, and select the best, most feasible methods of solution. In control and elimination of pollution and in environmental protection work, we must rely closely on and thoroughly utilize the existing enterprises as a great base. If the several hundred thousand industrial and mining enterprises and the tens of millions of employees with their rich experience, can increase their awareness of environmental protection one step and grasp production management and environmental protection work together, they will be certain to attain excellent results.

Basically, strengthening environmental protection management requires concentration on prevention, coordination of prevention and treatment, strengthening of management, use of management to encourage treatment, protection of the environment and development of production.

By strengthening environmental management work we can, while not increasing investment or while even decreasing it slightly, actually have both production and environmental protection achieve great results. On the basis of statistics from several enterprises, 70 percent of the causes of environmental pollution stem from poor management, 20 percent from a lack of comprehensive utilization, and only 10 percent from the technical factor of lack of purification equipment. For example, a chemical engineering plant discharged 90 tons of wastewater a day, and the masses inside and outside the plant complained about it a great deal; the top-level management handled it as a short-term treatment item and invested several hundred thousand yuan in it. But things proceeded so slowly that they could not solve the problem. When the environmental protection law was implemented and fines were collected for pollution, on the basis of the quantity of the plant's discharge it had to pay 400,000 yuan a year. Because environmental protection measures which were coordinated with economic methods were adopted, they stimulated the plant to control the amount of water used and to decrease pollutant discharge. In the past it had to discharge 90,000 tons of wastewater a day; now it has decreased the figure to 4,000 tons, and including implementation of other comprehensive utilization measures, it has only had to spend 40,000 yuan, while

in a year it can recover 600,000 yuan. Clearly if we start by strengthening enterprise management, there is a great deal of latent potential for good environmental protection work.

Recently, the Central Committee Secretariat offered four suggestions regarding Beijing's work policy, requesting that Beijing be remade and built into an attractive, clean, first-class modern city and that it be made to develop in accordance with its function and characteristics as the capital, that overall planning be used and that the development of heavy industry be controlled; the suggestions pointed out the direction for improving Beijing's environmental quality, set environmental goals and received the support of the broad masses of the people, and thus constitute a strategic decision on environmental protection and development of production. Every locality and department can follow their comprehensive guidance for short-term and long-term development so as to provide the basic and essential conditions for development of production and environmental protection.

3. Grasp environmental protection and development of production together.

In the case of new construction, expansion, reconstruction and relocation projects, particularly engineering proposals in which the production process can result in great toxicity and extensive harm, the construction organizations must undertake or assign to the environmental departments for joint work the making of advance environmental quality evaluations for the plant site. These must include selection of a production technology approach for the project, a forecast of pollutant distribution and discharge quantities, a survey of the environmental condition of the plant site and an evaluation of expected environmental quality changes after it goes into production. The scientific data obtained from the advance environmental quality evaluation work are used to infer the changes in environmental quality that will result after the project is completed and put into production, and the effect on human health. The advance environmental quality evaluation will be used to produce an environmental quality report, and the environmental departments and relevant industrial leadership departments must give their approval before the design can be done. In carrying out the basic construction procedures for environmental protection facilities and construction on engineering projects, the "three requirements for simultaneity" [san tongshi 0005 0681 2514] must be strictly observed.

In the case of plants which have already gone into production, ways of controlling and eliminating pollution generally include: reorganizing the production technology approach with the adoption of nonpolluting or low-pollution raw materials sources so as to decrease sources of pollution by the three wastes; controlling feed ratios and reaction or combustion conditions in order to improve product yields, decreasing materials consumption and production of the three wastes, controlling volatilization, emission and leakage; strengthening recovery, and decreasing materials losses; implementation of separate collection and emission of concentrated and dilute waste chlorine, strengthening of the separation of clean and polluted flows, increased recycling of process water, economizing on water and electricity consumption, comprehensive utilization and recovery of useful materials, thorough utilization of the three wastes and waste heat, and suitable processing of those of the three wastes which cannot be utilized economically so that they present no harm to the environment. Taken together these approaches clarify an important point: that industrial pollution arises

during the production process, and accordingly pollution control and elimination should as far as possible be made part of the production process. To realize this aim, the proper measures should be taken with regard to environmental pollutants in industrial production: different pollutants should of course have separate management, technological and equipment focuses, but first we must take steps to strengthen management, organize it in a rational way, and thoroughly mobilize people's enthusiasm for uniting environmental protection and expansion of production. In everyday life, we should constantly grasp the combination of environmental management and production management in a practical manner and embody the requirements of environmental protection in indicators, data, and job procedure regulations. They should be included in enterprise production technology and economic management, made a part of the enterprise's major indicators, and included among the criteria by which the work of the enterprise and of various relevant personnel are judged.

When we are drawing up production plans we should include environmental protection work in them. When we are developing the job responsibility system we must specify the environmental tasks and duties of the various positions and of management organs and personnel at the various levels.

When we issue the production plan, we must discuss implementation of the individual environmental protection work items; when we conduct production control analysis, we must include environmental analysis items in production control analysis plan.

When we address technical and economic consumption norms and carry out analysis of economic and technical activities, we must calculate decreases in the three wastes and compute economic results accounts for comprehensive utilization and waste accounts for emission of the three wastes, so that it will be possible to see what kind of contribution the enterprise is making to the four modernizations. When reviewing work we must review environmental protection work, and when summarizing production incentives work we must summarize the contribution of incentives to environmental protection.

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CSO: 5000

ACID RAIN THREAT TO BEIJING ANALYZED

Beijing HUANJING BAOHU [ENVIRONMENTAL PROTECTION] in Chinese No 5, 1980 pp 17-19

[Article by Xia Zenglu [1115 1073 4389]: "Can Acid Rain Harm Beijing?"]

[Text] In Western Europe and North America acid rain has already become an important aspect of atmospheric pollution. Because it results in acidification of water bodies and soil, harms human health and plant and animal life, corrodes city buildings and affects the natural ecological system, it is already the subject of concern by the people and scientists of all countries. Currently our country is moving forward with the four modernizations, and industry will be developing rapidly; under these conditions, we will be investigating the origin of acid rain and what harm it does, and whether it can effect the Beijing area. These questions are worth attention and investigation.

1. What Is Acid Rain and How Is It Formed?

Acid rain is generally precipitation which contains a certain quantity of sulfuric or nitric acid. The pH of this precipitation water can reach 4 or even lower. The main factor leading to the low pH of the rain is sulfur dioxide, which produces sulfuric acid; the nitrogen oxides which produce nitric acid are very much a secondary factor. Accordingly, at present acid rain currently involves the common atmospheric pollution by sulfur dioxide.

In the natural world there are many sulfur-releasing phenomena. For example, lakes, marshes, low-lying ground and the continental shelf can give off some hydrogen sulfide, which is oxidized in the atmosphere to sulfur dioxide, and volcanoes can give off small quantities of sulfur dioxide when they erupt. The sulfur given off in these ways is part of the natural sulfur cycle. Excluding certain very uncommon conditions, under which rather high local concentrations can be formed, concentrations are generally low, so that the atmosphere easily dilutes the sulfur dioxide, thus purifying itself and preventing the sulfur dioxide from becoming a significant phenomenon. Accordingly, under ordinary conditions acid rain cannot be formed. However, during recent industrial development, and especially as a result of large-scale use of coal and oil, large quantities of sulfur dioxide have been discharged into the atmosphere, so that the natural equilibrium of this sulfur cycle has been disrupted. According to statistics, between 1710 and 1950 the total annual quantity of sulfur dioxide emitted as a result of the use of sulfur-containing coal in Europe remained fairly stable at about 25 million tons. But as industry has developed at high speed, the quantities of sulfur dioxide emissions have increased sharply, currently reaching 60

million tons. It is estimated that currently 43 percent of the sulfur dioxide in the world comes from such manmade pollution sources as industry. Moreover, these manmade emissions of sulfur dioxide are generally concentrated in certain cities and industrial and mining localities, resulting in high local sulfur dioxide concentrations. Sometimes the concentration is several dozen times as high as under natural conditions, or even several hundred times. These high sulfur dioxide concentrations provide a sufficient material basis for the formation of acid rain in the atmosphere.

After sulfur dioxide enters the atmosphere, to become sulfuric acid it needs certain moisture conditions. A series of moisture condensation processes generally take place in the atmosphere, and when moisture condenses on the surface of suspended dust particles it forms a water film. When the sulfur dioxide which has entered the atmosphere comes in contact with these water films, it dissolves in them and forms a sulfurous acid solution. The reaction formula is: $\text{SO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{SO}_3$. It has been reported that in dry clean air it is difficult for sulfur dioxide to form sulfurous acid, and it can remain in the air for 1 or 2 weeks. But in a moist and smoggy atmosphere, in barely an hour the sulfur dioxide can form sulfur trioxide. Clearly the atmospheric moisture concentration is a factor promoting transformation of sulfur dioxide.

Certain catalysts are required for the sulfurous acid solution formed by contact of sulfur dioxide with the water film to go on to form sulfuric acid. The main such catalyst is certain pollutants in the nuclei on which atmospheric moisture condenses, for example such metal ions as Mn^{2+} and Fe^{2+} , which function as catalysts in the further oxidation of sulfurous acid. It has been reported that in a clean atmosphere only 0.1 percent of the sulfur dioxide reacts every hour. But in a polluted and smoggy atmosphere, after 7 hours the reaction is 20-30 percent complete.

From analysis of the process of formation of acid rain we can see that acid precipitation results primarily from high atmospheric concentrations of sulfur dioxide which in the process of atmospheric moisture condensation comes in contact with water to form sulfurous acid, and is then catalyzed by certain pollutants, becoming sulfuric acid.

2. The Harm Caused by Acid Rain

The harm to human health caused by acid rain is great. In foggy Western Europe, people are particularly sensitive to it. It is thought that sulfuric acid fogs are 10 times as poisonous as sulfur dioxide. When the atmosphere contains 0.8 mg/liter of sulfur dioxide, people show no evident sensitivity. But people find it hard to bear a sulfuric acid fog of the same concentration; such respiratory tract illnesses as asthma result. In major world atmospheric pollution incidents, such as the London "smog incident," and the Tokyo "photochemical smog" incident, sulfuric acid fog was present. It is no wonder that people call sulfuric acid fog an ubiquitous assassin.

In Western Europe, and particularly in places that lack a carbonate rock matrix, sulfuric acid does particularly grave harm to ponds and lakes. In these places the pH of the precipitation regularly reaches about 5.0. Because the acid rain that falls on the earth's surface cannot be neutralized by the surface material

during the runoff process, the acidity of pond water increases very rapidly. According to a survey of 400 lakes among the 3,000 on the west coast of Sweden, about half had a pH of 6.0 or lower. In spring and fall, as many as 22 to 36 percent of the lakes had a pH of 5.0 or below. Especially in the last 20 or 30 years, the pH values of some lakes have fallen 1 or 2 units. Because acid rain has a very corrosive effect on elements in the earth's surface, the chemical characteristics of the lakes have changed. In addition to an increase in sulfates in their composition and the conversion of calcium and magnesium carbonates to acid sodium, calcium and magnesium sulfates, concentrations of iron, manganese and other metals also increased. Because of the acidity of the lake water, the aquatic ecology underwent a series of changes. When the pH of the lake water fell below 5.8, many types of plankton such as diatoms and green algae disappeared, large quantities of aquatic animals gradually died out, and fish growth and reproduction were affected. When the pH of the pond water fell below 5.0, large numbers of fish died, and even some relatively insensitive fish such as perch and pike were strongly affected. Accordingly in Western Europe and North America, because of the acidification of ponds by acid rain, fish have died out or yields have decreased in thousands of ponds. Some areas in which people raise trout were also gravely threatened. It is estimated that if current acid rains are not controlled, but continue to develop, Sweden's thousands of ponds and lakes will gradually become acid lakes.

Acid rain also has serious effects on forests. It can hinder the sprouting of tree seeds and decrease forest leaf area and bark nitrogen fixation. It can also dissolve and remove nutrients in the leaves. When the soil is acidified by acid rain, the acute change in chemical processes in soil organisms may affect the entire forest ecological system. Because of the complexity of the situation, the consequences of these effects are still hard to foresee, but the direct results of acid rain have already been reported abroad. Swedish statistics indicate that acid rain effects cause an annual loss of as much as 4.5 million cubic meters of lumber.

Corrosion of city buildings, machinery, bridges and works of art by acid rain is even more shocking. The statue of Charles I in London's Trafalgar Square has been so corroded by acidic pollutants that it is already unrecognizable. The old art gallery in Munich, West Germany and Koln cathedral show evident damage. Acid rain's corrosive effect on metal is produced by H^+ and SO_4^{2-} . It also interacts with dry deposits of sulfur dioxide on the metal surface, promoting corrosion. However, it also has the effect of cleaning off dry sulfate deposits. Accordingly, the intensity of the effect is determined by whether the deposits are dry or moist. Experiments indicate that the rate of corrosion of metal is faster in cities with much precipitation than in those with little precipitation, and faster in cities than in the country. The rate of corrosion of carbon steel, for example, was 8 micrometers per year in the village of Fulahuerte [phonetic], while in the city of Stockholm it was 30 micrometers per year. Determination of rain sulfur content in 7 cities revealed that the sulfur content was closely coordinated with the metal corrosion rate. A correlation formula between certain climatic factors (humidity), sulfur dioxide content and corrosion has even been derived. In 1970 it was calculated in Sweden that every year the cost of corrosion of buildings and expenditures to protect them from early corrosion was 47.5 billion U.S. dollars. The United States figure is even higher, amounting to 147 billion dollars a year.

The effects of acid rain on the natural ecological system cannot as yet be comprehensively and precisely estimated. However, since acid rain has already produced evident effects on ponds and aquatic ecologies, its effect on soil and terrestrial ecological system can be imagined; research indicates that acidification of the soil can weaken or hinder nitrification in it and increase soil ammonification. Acid rain can effect the symbiotic balance between certain soil organisms and increase the rate of release of certain harmful metallic elements. The changes in the balance between a number of nutrient elements in the soil, and in soil organisms and biochemical processes in them produced by these effects must inevitably lead to changes in the terrestrial ecological system.

3. Can Acid Rain Do Harm in the Beijing Area?

Can acid rain be formed in the Beijing region, and can it produce harm? Because no extensive and thorough studies have been made, this is still hard to predict. Some say that the carbonates in Beijing's soil have a strong buffer capability, so that acid rain cannot be formed, and that even if it were it could not do much harm. This argument seems a little arbitrary. Because most soils in the Beijing area contain large amounts of carbonates and the soil pH is above 7, microscopic particles in the atmosphere resulting from local dust or coming from the northwest mostly contain carbonates. They can act to neutralize acids and prevent the pH of the water film on condensation nuclei from decreasing markedly. However, the development of things is not limited to internal causes; we must also consider externally caused processes. The acid resistance of microscopic particles in the atmosphere around Beijing may be a factor impeding the formation of acid rain, but it can only be a limiting factor, not a fixed, decisive factor; when there are large sulfur dioxide emissions in the area, the sulfur dioxide in the atmosphere is continuously available to incipient precipitation, so that this limiting factor can gradually disappear. The key factor here is sulfur dioxide emissions and their concentration in the atmosphere. Statistics indicate that in 1979 sulfur dioxide emissions in Beijing were higher than in both Tokyo and Los Angeles. Both Tokyo and Los Angeles have suffered from acid fogs, and if Beijing is attacked by such a high SO_2 level, can it be unaffected?

Actually, it has been reported that soils in the extreme south of Sweden contain carbonates just as those of Beijing do. But because of manmade pollution, acid rain has also been produced there. A small number of measurements made by the Institute of Geography, Chinese Academy of Sciences, indicate that the pH of rain in the Beijing area is generally about 6.5, with a single measurement of 7.3 recorded at Sanjiadian. Sanjiadian is in the Beijing suburbs, and if we take this reading as the reference point, the pH values of precipitation in the city are slightly lower. Is this the result of acidification? Moreover, in 1973 a value of 5.5 was measured at Beifengwo. This is a rather low value. On the basis of the foregoing, it may be premature to conclude that because the Beijing area has a certain capability for resisting acid, acid rain cannot be produced.

As for the contention that even if acid rain were formed it could not do much harm, this also merits discussion. We can imagine that because the area's soil contains carbonates, when acid rain accumulates on the surface it is neutralized during runoff, finally losing its acidity, which would indeed have a certain protective effect on the environment and give this area a rather strong acid-resisting capability. However, the drab soil production process in the Beijing

area has already given evidence of a certain leaching effect. The soil leaching process is of course extremely slow. However, under the influence of acid rain, it could speed up noticeably. Such instances have already been reported abroad. For example, because of constantly increasing amounts of acid rain, the pH value of heavy calcareous clay soils in the southernmost part of Sweden dropped from 7.5 to 6.5. When artificial acid rain (pH 3.0) was applied to the fields when planting 2 crops of vegetables, the soil pH dropped measurably. According to foreign estimates, if affected by rather strong acid rain, over the course of 20 to 40 years carbonate-containing soils can possibly become acidic soils. Accordingly, it is not impossible that the soils in the Beijing area might gradually become acidified under the long-term influence of acid rain. If the soil were acidified, it would be easy for the precipitation to become acidic as a result of a lack of condensation nuclei of an acid-neutralizing type. If this continued, acidification of the environment could be intensified.

In addition, the corrosive effects of acid rain on city buildings, machinery, bridges and works of art are rather direct. They are relatively little affected by the protective effects of carbonate dust. Considerable corrosion of buildings, bridges and antiquities has already been discovered in the Beijing area. Corrosion of iron and steel products is also common. Corrosion of the white marble and other marbles in certain famous Beijing antiquities has been discovered. All of these circumstances merit attention.

Can acid rain form in the Beijing region, and can acid rain do harm to the environment? This is a topic which urgently requires thorough study and should receive a precise answer.

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CSO: 5000

POLLUTANT DISCHARGE FEES DISCUSSED

Beijing HUANJING BAOHU [ENVIRONMENTAL PROTECTION] in Chinese No 5, 1980 pp 23-26

[Article by Zhou Fuxiang [0719 1381 4382]: "The Theory of Pollutant Discharge Fees, and an Investigation of Problems Arising in Its Implementation"]

[Text] Since last October, on the basis of the relevant provisions of the "People's Republic of China Environmental Protection Law (Trial Implementation)," many provincial and municipal National People's Congress standing committees and people's governments (revolutionary committees) have issued guidelines and regulations regarding the collection of pollutant discharge fees for emission of pollutants in excess of state standards; they have also been experimentally implemented in a number of enterprises and services. Experience with the trial implementation proves that the collection of pollutant discharge fees uses economic levers and links environmental work with the operating results of the polluting units and with the employees' interests, helps mobilize enthusiasm for pollution control, and is an effective economic measure for environmental protection. This paper will discuss the theory of pollutant discharge fees and some problems of their implementation.

The Theory of Pollutant Discharge Fees

From the present standpoint, there are two different types of pollutant discharge fees. In one case, when an enterprise discharges wastewater into the municipal sewage system, it must pay a certain amount to the municipal wastewater treatment plant; in the other, when an enterprise discharges wastewater into a river or discharges waste gases into the atmosphere, thus polluting the natural environment and harming the interests of society, it must pay a certain pollution fee. The former charge is easy to understand, for when wastewater is discharged into the treatment plant's pipeline system, naturally part of the investment in the sewage system equipment and the transport and treatment expenses should be borne by the party that discharged the wastewater; this type of fee has long been in existence. The pollution fees in force in Baoding City, Hebei, are of this type. But the present article is intended to discuss the other type of pollution discharge fees.

For a long time, it was thought that rivers and the atmosphere had an unlimited ability to purify pollutants, and when pollutants were present a flood or a wind storm could eliminate pollution. Accordingly, when building factories, people generally used rivers as wastewater discharge channels, the atmosphere as a

waste gas disposal area, and the soil as a solid waste dumping area. Moreover, many design personnel or enterprise leaders who wanted to save the fees and investments for treatment of wastewater, waste gas and solid waste gave little thought to the negative consequences that could come of discharging pollutants into the natural environments. Only since the 1960's, when environmental pollution became a major world concern, has it begun to receive serious attention. Water sources such as rivers and lakes, as well as atmospheric resources and soil resources, are by no means unlimited. Although water and the atmosphere have the capability of diluting and purifying wastes, ultimately they have certain limits, and if these limits are exceeded they will lose their capabilities and environmental pollution will be produced; furthermore, they are a resource for the continued existence of humanity, and if this resource is disrupted, man's existence and the development of industry and agriculture can be affected. Accordingly we must strictly control emissions of pollutants, prevent pollution and preserve water, atmospheric and soil resources.

When an enterprise discharges a pollutant into a river or the atmosphere and pollutes the environment, this inevitably has its cost, and the enterprise must take economic responsibility for it. The economic responsibility includes two things: first, since water and atmospheric resources are limited, if someone damages them he must take economic responsibility for recovering them; second, someone who pollutes water or the atmosphere has caused a loss to society, and he must take economic responsibility for controlling the pollution and compensating the loss. If someone discharges pollutants in excess of state standards and regulations, it is reasonable that he should take economic responsibility for this, and pay a certain pollutant discharge fee. On the other hand, including this pollution fee in the enterprise's production costs helps to oversee and stimulate enterprise pollution control and protect the environment. The first country to implement taxation for pollutant discharge was West Germany, which applied this policy to the seriously polluted Ruhr industrial district in 1904 [as published]. In September 1976 it formulated the world's first pollution taxation law, the "Law on Taxation for Discharge of Wastewater into Water Sources." This law specifies that starting in 1981 pollutant taxation will apply universally. The United Nations Conference on Trade and Development held the first environmental ministerial conference in November 1974 and defined the principle of pollution fees.

We are a country under the system of public ownership, and enterprise interests and society's interests are essentially identical. This is a difference from the capitalist private ownership system. The state can use planning of the national economy to make economic development and environmental protection proceed in harmony with each other; and by planning it can oversee enterprises and encourage them to control pollution, gradually, group by group and at different times. But in practice, because their positions are different, enterprises generally lay particular emphasis on product output rather than on pollution control, and some, for the particular economic interests of the enterprise, purposely discharge pollutants and harm society's interests. Accordingly, in order to encourage enterprises to speed up pollution control it is also necessary to adopt the economic device of pollution emission fees as a measure in support of the plan.

The purposes of our country's implementation of the pollutant discharge fee are: first, to make it clear that if an enterprise discharges pollutants and pollutes the environment, it must take economic responsibility for cleaning up the

pollutants; second, use of the economic measure of pollution fees assures implementation of the state's environmental protection objectives and plans; third, it connects pollution control closely with the enterprise's reform of manufacturing processes and production management, favors decreased waste and conservation of resources, and gives an incentive for the development of production. In view of the experience in implementing pollution fees in Suzhou, Yunnan, Jinan, Hangzhou and Lanzhou, their effects are outstanding. First, they have reformed the past practice of relying on state investments for pollution control, have mobilized great enterprise enthusiasm for pollution control, and have accelerated its pace while also saving resources. For example, the Guangming Phosphate Fertilizer Plant in Yunnan discharged large quantities of fluorine-containing wastewater, and was an important source of pollution of the Tanglang River. At the beginning of 1978, the provincial environmental protection office was preparing investment for pollution control in this plant, but the plant's leadership was concerned that installation of closed-cycle wastewater facilities might affect the output and quality of phosphate fertilizer, and refused to accept the investment. Last year it reluctantly accepted the investment, but never was enthusiastic about pollution control. In October it learned that it would have to pay a pollution fee, and in that month it commenced work on the pollution control project; while making a major construction effort, it also did everything it could to use and recycle process water, which quickly reduced wastewater discharged by the plant by more than half. The Huasheng Paper Plant in Suzhou City was in a similar situation: for many years pollution control had been proceeding only slowly, and last year when the pollution fee was implemented, according to regulations this plant had to pay 63,000 yuan per month, which would have raised its production costs by 3.8 percent and decreased staff and worker year-end bonuses by 10 yuan each. The plant leadership was extremely concerned; it held a staff and workers representative conference at which it explained the bill accurately to the employees and proposed an 8-point program for increasing output and engaging in conservation, requesting everyone to begin decreasing waste and strengthening management of the enterprise so as to make up for the increase in production cost resulting from the fee. At the same time, it adopted a new process using the efflux air flotation method to recover clear water on the No 2 paper machine. In just a few months, the plant's wastewater emissions were decreased by 30 percent, and the total quantity of organic material lost in the wastewater decreased from 120 tons a day to 39 tons a day. The total saving on production costs for 1979 was 524,000 yuan, a decrease of 3.7 percent from the plan figure, realizing a profit of 4.85 million yuan, up 250,000 yuan from the plan. Not only did the pollution discharge fee not increase production costs, but it actually saved resources, decreased waste and increased profit.

What kind of fee is the pollutant discharge fee? Is it a fine or a tax? This is a problem that merits study. Different approaches are used abroad. I believe that it is more reasonable for it to be a tax in our country. The reasons are: First, under most circumstances, the pollution resulting from discharge of pollutants by our country's enterprises is not the enterprises' fault, but was caused by the state's (including the local governments') failure to pay attention to environmental protection when arranging for production construction. When they were under construction, many enterprises did not institute pollution prevention measures, and some cut them out in order to save on investment; some leading departments laid excessive stress on production indicators, and only requested that the enterprises increase their production capabilities, paying no attention to recovery of

byproducts or purification and treatment of pollutants; some of them only issued plan targets for products and did not have any requirement for antipollution measures, so that many enterprises could not meet state standards regarding discharge of pollutants, which resulted in serious pollution. Many enterprises in this country built themselves up gradually by simple and thrifty operation and adopting local methods, so that they were far behind on pollution control equipment. Accordingly, it is unreasonable to expect that the enterprises will bear the whole of this historical economic responsibility. Second, the purification expenses which an enterprise saves by not having pollution control equipment ultimately are paid over to the state in the form of profit payments. Third, some of the "Experimental Standards for Discharge of the Three Wastes by Industrial Enterprises" issued by the state are quite unreasonable and unscientific. Accordingly it is more reasonable for pollutant discharge fees in this country to be a kind of tax.

Principles of Determining Pollutant Discharge Fee Standards

In theory, the pollutant discharge standards should be slightly higher than purification treatment expenses. This can be expressed in the formula

$$W \geq Z_n + C,$$

where W is the pollutant discharge fee, Z_n is the depreciation expense on transport equipment, and C is the treatment expense (including manpower and raw and other materials).

High pollutant discharge fees help encourage polluting units to control pollution. Low fees may cause polluting units to prefer to pay the fee rather than construct pollution-control facilities. However, if the fee is too high it may cause the enterprises' production costs to increase and decrease their accumulation rates.

The pollutants discharged by an enterprise generally contain many different materials, and accordingly some provinces and cities use a multifactor-cumulative method to set the fees, i.e. they calculate the extent to which different pollutants exceed standards separately, then calculate the fee. Theoretically there is some point to this method, but in real circumstances, the pollutants discharged by many enterprises in this country exceed the standards by large amounts. If the calculation is made by this method, there will have to be a payment of several yuan, 10-odd yuan or even several tens of yuan per ton of wastewater, which will inevitably exceed the enterprises' economic capabilities. These enterprises cannot establish pollution control measures in a short time, and some will also want to couple them with process changes. Accordingly, in studying how most reasonably to fix the fee standards, the investigation should not proceed only in theoretical terms, but should be conducted concretely, in connection with the actual situation in this country.

When we talk about their being reasonable, I believe that this primarily means that when the fee standards are established they should square with the actual circumstances of pollutant discharge by enterprises in this country. In view of the fact that the vast majority of this country's industrial and mining enterprises do not have pollution control facilities, it is too harsh an approach to implement the emission standards issued by the state, and accordingly the fees

cannot be set too high and the categories for fee determination cannot be too detailed. The following principles can be considered for the fees:

1. Fee standards can be differentiated for enterprises without pollution control equipment and those with pollution control equipment. The fees can be set a bit higher for enterprises which have pollution control equipment and cannot operate it normally, or which have poor pollution control results that do not stem from design. The fee standards for such plants can be fixed in terms of the expenses for normal operation of the pollution control equipment to encourage them to take effective steps to put the treatment or recovery equipment into normal operation.
2. Fee standards can be differentiated to some degree for new and old enterprises. The fee standards for newly constructed enterprises should be somewhat more stringent and those for older enterprises somewhat more lenient.
3. Fee standards can be differentiated for enterprises for which pollution control technology is adequate and those for which pollution control technology is not adequate. In particular the fee standards can be set higher for cases where the pollutants cause serious harm and for which there is a mature treatment technology so that it is possible to control pollutants without a very large expenditure, in order to encourage the enterprise to take control measures in good time and decrease pollution. The fee standards can be somewhat more lenient in the case of pollutants for which control technologies are not adequate.
4. The fee standards can be differentiated for large-to-medium-size enterprises on the one hand and medium-to-small-size enterprises on the other. In general, the fees for medium-to-small-size enterprises should be more lenient.

In sum, the setting of pollution fee standards should be based on the actual circumstances and should achieve the goal of both favoring pollution control and being able to encourage the development of production.

Principles for the Use of Pollutant Discharge Fees

In theory, the principles for the use of the pollutant discharge fees are determined by their character. As we said above, we believe that the fees should be taxes rather than fines in nature, so that like other taxes, after they are collected by the environmental protection departments they are deposited in the local financial organizations and are fully controlled by the locality. This approach has several advantages. First, the local governments can carry out overall planning for their use and strike an overall balance. Second, this helps bring environmental planning into the orbit of production construction planning. Third, it favors unified consideration in connection with the development of production. If the environmental protection departments control this money, this will completely shift the responsibility of pollution control onto these departments; in some cities, after the environmental production departments collected the fees, the industrial and mining enterprises came to them in large numbers to ask for pollution control investments and requested that the pollution control departments arrange for the equipment and construction manpower and the like. This approach is not consistent with the principle established in our country that "The one who pollutes must bring it under control," and is also unfavorable for mobilizing the

enthusiasm of the cognizant departments and the enterprises for pollution control, to say nothing of connecting environmental protection work with production construction and overall planning and disposition.

The pollutant discharge fees collected locally can be used as an environmental protection funds, as in the case of the forestation fund set up by the forestry departments, and the funds can be used solely for pollution control and improving the environment. In the country's current economic system, most of the environmental protection funds will have to be used for control of pollution sources, including readjustment of placement of industry, and as subsidies for environmental monitoring and scientific research and the like, in addition to which they can be used as awards to enterprises which control pollution and protect the environment.

The pollutant discharge fee is an economic measure with a strong policy aspect, and the fixing of fee levels is particularly complex. Accordingly, in implementing the pollutant discharge fees, we must first organize manpower and carry out comprehensive surveys and determinations of the quantities of pollutants discharged by industrial and mining enterprises in the area and the concentrations of harmful substances, and in addition set up a good monitoring system, including scheduled monitoring in the plants themselves. Judging from the experimental implementation in various locations, there are still many problems in our provisional standards for discharge of the three industrial wastes, and they are really insufficiently scientific and insufficiently reasonable to serve as legal bases for the pollutant emission fees. It is best for each locality to draw up its own discharge standards and use these to determine the fee levels.

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CSO: 5000

NUCLEAR POWER PLANTS DESCRIBED AS ENVIRONMENTALLY SAFE

Beijing HUANJING BAOHU [ENVIRONMENTAL PROTECTION] in Chinese No 5, 1980 pp 45-47, 27

[Article by Li Qidong [2621 0796 2639]: "Nuclear Power Stations and the Environment"]

[Text] 1. The Current Most Competitive Energy Source

Currently the energy sources which we use in the largest quantities are coal and petroleum. It is estimated that recoverable coal and petroleum in the earth's crust are only sufficient for 100 years, in addition to which since coal and oil are important chemical engineering raw materials, using them as fuels is extremely irrational. Water power, wind power, tidal power and geothermal power have many limitations, and although solar power is excellent, it is limited by the utilization technology, and in the next few decades it will still not be possible to use it on a large scale. Accordingly, nuclear power is the power source which is currently most competitive with fossil fuels. Currently, power stations using light water reactors have already been in successful operation for many years, and the cost of the electricity they produce is lower than that of fossil-fuel electricity (in U.S. coal-fired plants the price is about 1.8¢ per kilowatt-hour, while in oil-fired plants it is about 3.34¢ per kilowatt-hour and in nuclear power plants about 1.52¢ per kilowatt-hour), which clearly demonstrates its economic superiority. Reserves of fissionable materials can meet the needs of human society for several hundred years or even longer. There is in the nuclear field an even more desirable power source, fusion energy, whose use is expected to become a reality in the 21st century, and it will be only at that time that there will be a truly inexhaustible, ideal energy source. Accordingly it is reasonable to say that nuclear power must be developed.

Because of many historically based doubts about the safety of nuclear power stations and some unnecessary fears of radiation, the development of nuclear power has been accompanied by certain mental blocks. How much radiation is there actually? How big an effect can it have? In order to answer this question, we must first come to an understanding of radiation in the environment.

2. Constant Radiation Sources in Our Surroundings

Some people associate radiation with nuclear explosions and the deaths they cause or with a lowered white blood cell count, loss of hair and the like. But in reality this is not quite the case. Let us point out that there are radiation

sources everywhere in nature, even in your own body, which follow you constantly and cannot be escaped for even a moment. This is because there are a number of radiation-producing factors constantly at work in the environment, including natural radioactive elements such as uranium, thorium, radium, potassium 40 and the like, which are mostly present in rocks and minerals and become dispersed through the ground as the result of many years' weathering and by mining activities, while the decay products of these nuclides, such as radon and fission products, are gases and are constantly diffusing through the atmosphere; this is one source of the radiation received by the human body. These radioactive elements also are constantly present in building materials, so that it is possible to be subjected to radiation by living in a house, with the levels reaching several dozen millirads a year. Cosmic rays are an important source of natural radioactivity, for they generally include some high-energy neutrons, protons, deuterium nuclei and the like, which when they enter the atmosphere interact with the air to produce a number of radioactive nuclides such as tritium, carbon 14 and beryllium 7, maintaining them at a certain concentration in the atmosphere.

What may startle you even more is the fact that 10 different nuclides such as potassium 40, carbon 14 and rubidium 87 constantly have a certain concentration in the human body, and constantly subject people to radiation; it is estimated that the average potassium content of the human body is 0.2 percent, and that of chromium 17 ppm, so that these radioactive nuclides alone in the human body subject people to a radiation dose equivalent to about 18 millirads a year.

In addition to natural radioactivity, various human activities have produced man-made radioactive pollution in the atmosphere and the environment, and have increased the level of radioactivity in our surroundings. A relatively important factor is radioactive diagnosis in medicine, radiation treatment, isotope medicines and the like. Another important source is nuclear weapons tests: 1 minute after the explosion of a 1-megaton or larger nuclear device 4×10^{12} curies of radioactivity will enter the atmosphere, most of it forming radioactive dust, which continuously settles to the earth's surface as fallout. Between World War II and 1963, the Soviet Union, the United States and the United Kingdom detonated nuclear devices equivalent to 511 megatons of TNT, producing rather large-scale and serious pollution.

Another source is the nuclear power supplies carried by satellites and spacecraft, which can be dispersed through the atmosphere by an accident, as in the case of a U.S. satellite which as the result of an unsuccessful launch on 21 April 1964 returned to the atmosphere at 150,000 feet and burned up, dispersing 17,000 curies of plutonium 238 into the atmosphere, which it is estimated will be settling to the earth's surface for about 70 years. The Soviet Union uses a reactor as a power source in radar satellites, but on 24 July 1978 Kosmos 954 fell and burned up completely, scattering fragments through the atmosphere and increasing the radioactive pollution of the environment.

Once we know the sources of radioactivity in the environment, when we compare them with the amount of radiation produced by nuclear power, the latter is insignificantly small.

3. A Truly "Clean" Energy Source

Among the energy sources which are currently economically significant, nuclear power is one of the cleanest, because since the day it originated the nuclear

power sector has considered waste treatment and environmental protection as primary concerns. Since currently more than half of the nuclear power stations in operation worldwide use pressurized water reactors as a source of steam, we can take the pressurized-water reactor as an example to consider just how great an influence on the environment nuclear reactors have.

Fig 1 is a diagram of a pressurized-water nuclear reactor in which the reactor core is made of uranium oxide fuel elements with zirconium alloy cladding, which under the influence of neutron bombardment undergoes fission and emits heat; the heat is carried away by circulating water and produces steam in the secondary circuit to drive a steam turbine generator. But the fission process also produces large quantities of fission products, which are the source of the hidden danger of a nuclear power station. In order to prevent radiation release to the surroundings, several barriers have been installed. The first barrier is the zirconium alloy cladding, which is especially strong and resists cracking, so that 99 to 99.99 percent of the fission products are sealed inside the cladding and are not released to the outside. But there can be 0.01 to 1 percent of the components which fail and crack, allowing the fission products to enter the coolant, and make it rather strongly radioactive.

Although the coolant is sealed in the pressure vessel, cracking of the pipes or leakage in pumps and valves can allow the fission products to enter the containment vessel. Some of the gaseous and liquid wastes are produced in this way. In order to decrease radioactivity levels in the coolant, desalting devices which contain large amounts of ion exchange resins constantly filter it, eliminating soluble fission products and solid microscopic particles. The used ion exchange resin is the main solid waste from nuclear power plants.

Of the solid, liquid and gaseous waste products released by nuclear power stations, the main source of radiation for humans is gaseous waste. Accordingly in the past 20 years a great amount of research work has been done worldwide on gas purification, and effective results have been achieved. In gas purification treatment, the delayed decay and emission method is used for relatively short-lived nuclides, requiring that before they are emitted from the stack they be delayed for a certain amount of time so that most of the short-lived isotopes decay and disappear. High efficiency filters are used with radioactive aerosols and particles. Filters with wet activated charcoal or yinfeishi [6892 3110 4258] produce a very great filtering effect on volatile materials such as iodine and ruthenium. There are a number of treatment methods for the inert gas krypton 85 and tritium, but not many of them are used in commercial nuclear power plants. A flowchart of the waste gas treatment system generally used in pressurized-water reactors is shown in Fig 2. The quantities of inert gases, halogens and particles released into the environment after this kind of treatment are only a few percent of the permitted levels.

The above simple introduction and 20 years' experience prove that nuclear power plants have a very small effect on the environment. In contrast, fossil-fuel-powered stations, to which everyone is accustomed and which are not feared as a cause of fear, actually have far greater effects on the environment than nuclear power stations. According to U.S. statistics for 1968, every year atmospheric pollution from fossil-fired power plants includes 100,000 tons of carbon dioxide, 5.6 million tons of particulate matter, 16.8 million tons of sulfur dioxide and 400,000 tons of nitrogen oxides, producing large quantities of serious atmospheric

pollution. If concentrations of carbon dioxide in the atmosphere are allowed to rise, the effects of the resultant heat effect will be unthinkable. Not only that, but even their radioactive emissions exceed those of nuclear power plants, a 1-million kilowatt coal-fired power station releases radioactive material in coal which, assuming a minimum uranium content of 1.1 ppm and a thorium content of 2.0 percent in the original coal, will amount to 350 millicuries of radium 228 and 550 millicuries of radium 226 into the environment; if these quantities are converted into cancer incidence, fossil power accounts for 2.4×10^{-6} cases a year and nuclear power 3.4×10^{-8} cases a year, and although these numbers are very small, the danger from fossil-fueled power plants is 70 times greater than that from nuclear power plants. This shows even more forcefully that nuclear power plants are truly a clean power source.

4. Nuclear Power Plants Are Basically Different from Nuclear Bombs

"Although nuclear power plants in normal operation are safe, if there is an accident there might be a nuclear explosion"; this is another concern that troubles some people. What is the real state of affairs? In the more than 20 years since the startup of the first nuclear power station in 1954, there have been more than 100 large and small accidents, but in essence none of them produced any great pollution of the environment. This is because of a variety of safety measures and treatment of the three wastes in nuclear power stations; and the consequences of the accidents actually confirmed the safety and reliability of nuclear power plants.

What exactly is a nuclear power plant accident? These are actually reactor accidents, and can be classified in three categories: (1) criticality accidents; (2) fuel meltdown and cladding failure accidents; (3) reactor and power station equipment failures. All of these types of accidents have occurred, but the maximum likely accident from whatever cause is a "coolant loss accident," while a more common one is a cladding failure accident. Because dense monitoring systems have been designed and there is a series of safety measures, accidents can be suitably handled and cannot produce grave results. This safety equipment includes: the containment vessel, the contaminated water reservoir, water cooling, a reactor core emergency cooling system, a fog system, a cooling circuit filtering system and so on. These are shown in Fig 3.

Let us now consider the environmental effects of several relatively major accidents. In January 1961, the SL-1 experimental boiling reactor in Idaho momentarily went critical as a result of excessively rapid withdrawal of the control rods, resulting in melting of 20 percent of the components, but the 5 percent of radiation was kept within the containment vessel, so that it did not cause any environmental pollution. Even in the case of the earth-shaking 28 March 1978 accident at Three Mile Island in which coolant loss caused a partial core meltdown, so that 10 percent iodine 131 and cesium 137 entered the coolant, a complete investigation showed that during the accident only 1 curie of iodine was released, and the iodine content in environmental samples was about 1/300 the maximum permissible value; the Food and Drug Administration inspected 377 samples and did not find any emissions from the power plant. The radiation dose received by the public did not exceed 100 millirems, which is equivalent to the base value of natural radiation which they receive, so that the consequences were insignificant. This fact further shows the safety of nuclear power plants: even though an accident occurs, it

cannot have any major effect on the environment, much less produce a nuclear explosion, because the fuel of a nuclear power plant is different from that of a nuclear bomb; even if the fuel of a nuclear power station were placed in a nuclear bomb it could not explode--even less so given the various reactor design safety features. This is why we say that nuclear power plant accidents are avoidable and are not grounds for fear.

5. A Brilliant Future

As nuclear technology has developed and the cheapness and safety of nuclear power plants has gradually increased, stress has come to be placed on increasing the quality of equipment assemblies and components; currently the component failure rate is generally less than 0.01 percent, while investigation and location of cladding failure has led to better approaches. If an accident should occur, the safety systems will immediately react and bring it under control, waste treatment is daily improving, and accordingly the superiority of nuclear power plants will be further brought into play.

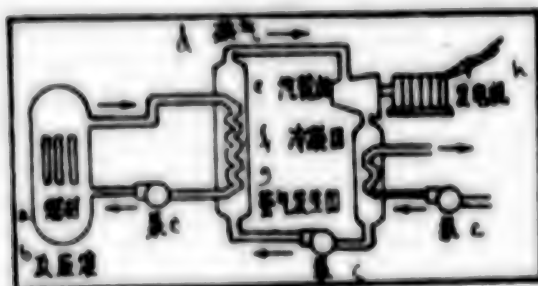


Figure 1.

Key:

- a. Fuel
- b. Reactor
- c. Pump
- d. Steam

- e. Steam turbine
- f. Condensor
- g. Steam generator
- h. Electrical generator

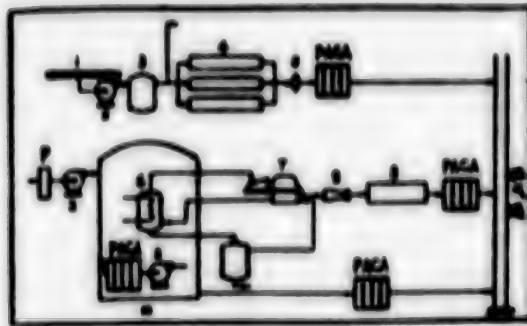


Figure 2. Waste gas system of pressurized-water reactor power station

Key:

- | | |
|--|------------------------------|
| 1. Gas collector for main cooling system circuit | 7. Steam turbine |
| 2. Compressor | 8. Condensor |
| 3. Surge tank | 9. Air jet |
| 4. Decay tank | 10. Safety containment |
| 5. Perforated plate flow regulator | P. Prefiltering unit |
| 6. Steam generator | C. Activated charcoal filter |
| | A. High-efficiency filter |

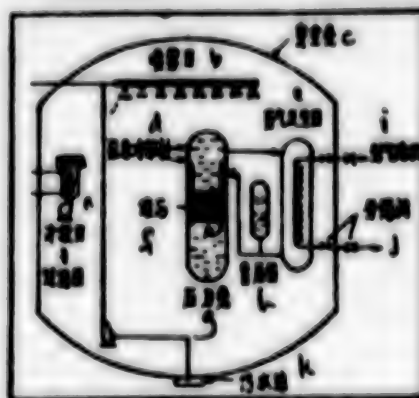


Figure 3. Safety equipment of typical pressurized-water reactor power station

Key:

- | | |
|-------------------------|---------------------|
| a. Condensor and filter | g. Pressure vessel |
| b. Fogger | h. Surge tank |
| c. Safety containment | i. To steam turbine |
| d. Emergency coolant | j. Isolating valves |
| e. Steam generator | k. Wastewater sump |
| f. Reactor core | |

8480

CS0: 5000

ENVIRONMENTAL ADVANTAGES OF METHANE PRODUCTION DETAILED

Beijing HUANJING BAOHU [ENVIRONMENTAL PROTECTION] in Chinese No 5, 1980 pp 28-29

[Article by Jin Shui [6855 3055]: "Extensive Methane Production Is Advantageous to the Agricultural Ecological Balance"]

[Text] For a long time, most of the countryside has been accustomed to use crop stalks and grasses as fuel. As our country's rural population has increased sharply, the quantities of household fuel required have increased considerably, and cannot be met solely by burning stalks. People are even at the point of stripping turf, digging up grass roots, cutting down trees, digging up tree roots and the like. It is estimated that every year the quantity of stalks produced nationwide is about 400-500 million tons, of which about 60-70 percent (more than 300 million tons) is burned as fuel. This method of directly burning stalks, sod and trees is not only very inefficient energy use, but in addition causes the soil to lose large quantities of organic nutrients. It is estimated that as a result of the burning of stalks, every year about 270 million tons of organic nutrients and large quantities of the nutrient elements nitrogen and phosphorus are lost nationally. Growth of crops requires that they absorb large quantities of organic matter from the soil, and the quantities of organic fertilizer applied to the soil every year are rather small, so that the organic content of the soil has been insufficient for a long time. If this burning of stalks goes on year after year, the soil fertility will decrease steadily, and although chemical fertilizers are applied everywhere, because of prolonged rather small applications of organic fertilizers, the soil structure will be disrupted. In addition, great damage to such natural plant cover as turf and trees will result in soil erosion, so that in some areas there will be a succession of natural disasters, and the even worse result will be that good land will gradually become wasteland. This will result in a grave disproportion in the material balance between the soil and agricultural crops and will disrupt the agricultural ecological system.

If farms engage in large-scale methane production, they can bring about thorough, comprehensive utilization of the biological capacities of agricultural crops and weeds, and produce a relatively complementary and stable closed material cycle between agricultural crops and the soil. This will also preserve the relative balances in agricultural ecology.

We can see from the chart that agricultural crops which rely on the soil for growth and propagation can participate in material cycles in many forms. The first type is: soil --> crop burning of stalks --> ash --> soil. The ash returned to the

soil only contains a certain quantity of potassium carbonate and the nutrients phosphorus and calcium. All the organic material and large quantities of nitrogen and phosphorus are lost. This is an unscientific, backward method of utilization. It does not unify energy and fertilizer efficiency, and if it is continued it can produce a pernicious material cycle between crops and the soil, and the agricultural ecological balance will be greatly disrupted; but at present this method is still rather widespread. Knowledge regarding rational utilization of crop stalks must be propagandized and popularized among the broad rural masses in order to bring about a change. The second form is soil \rightarrow crop $\xrightarrow{\text{direct composting}}$ soil.

The returning of stalks to the soil by manmade composting and natural decomposition of stalks and weeds, so that organic matter and nitrogen, phosphorus and calcium are largely returned to the soil, is relatively effective in maintaining and increasing soil fertility, and accordingly it preserves the agricultural ecological balance. But under current circumstances, because of the lack of domestic fuel, the proportion of stalks that can be returned to the field is still very small. And in fact this method too wastes large quantities of energy and usable feeds, and is not an advanced, rational method; accordingly it must be changed. A third type of cycle is: soil \rightarrow crop (stalks, weeds) \rightarrow methane fermentation tank water, fertilizer sludge \rightarrow soil. This cycle involves first placing crop stalks

and weeds in a methane fermentation tank to produce methane for fuel, while at the same time obtaining tank water and fertilizer sludge, thus obtaining both energy and organic matter and producing a marked improvement in the physical and chemical condition of the soil; for example, organic matter, total nitrogen and total phosphorus increase, density decreases, porosity is increased, mellow soil layers become thicker, and the structure is improved. This is a great improvement over the two previous approaches and gives rich yields of both energy and fertilizer. But if large quantities of stalks which could be used as fodder are directly introduced into the fermentation vessels, we cannot resolve the contradiction between fuel, feed and fertilizer which actually exists in the countryside. Accordingly, this is still not the most rational form of utilization of biological capabilities. The fourth form is: soil \rightarrow crop $\xrightarrow{\text{food feed}}$ humans, animals (livestock) $\xrightarrow{\text{manure}}$ soil. This cycle uses agricultural products and certain stalks as food for humans and feed for animals, after which the large quantities of manure produced are processed and then directly returned to the soil, increasing soil organic matter and nutrients and solving the contradiction between feed and fertilizer in the countryside; but it does not solve the fuel problem and does not make adequate use of biological energy, so that it too must be further improved. The fifth cycle is: soil \rightarrow crop $\xrightarrow{\text{food feed}}$ humans, animals $\xrightarrow{\text{manure}}$ methane fermentation

tank water, fertilizer sludge \rightarrow soil. This cycle is rather rational and can make thorough use of crop products and stalks and weeds. In the process, the energy in crops is first used as food for humans and livestock, after which human excrement, livestock manure, weeds and crop stalks which cannot be used as feed are all placed in digesters for fermentation, producing methane gas as a fuel; the liquid and sludge in the digesters still preserve the great bulk of the organic material and nutrients such as nitrogen, phosphorus and potassium, which make an excellent-quality organic fertilizer. This method uses the energy in the crops several times over, and uses the plant stalks' various potentials as fuel, fertilizer and feed thoroughly and harmoniously; it is the economically most effective method of using crops, stalks and weeds comprehensively and an effective and reliable approach to preserving the agricultural ecological balance. Accordingly it can preserve the

agricultural environment and greatly stimulate the development of agricultural production. In 1976, for example, Mianyang City, Sichuan, converted to methane, and the chemical fertilizer used citywide was decreased by a million jin, while total foodstuffs output was up 13.2 percent over 1975. In addition, for the last few years Wujin County, Jiangsu, has rapidly developed methane construction and accompanied it with continuous implementation of policies, and at the end of 1979 its pigpens contained 671,000 pigs, a record number. They have many pigs, much manure, much material for the methane digesters, large amounts of fertilizer and large food yields.

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CSO: 5000

STATE COUNCIL ENVIRONMENTAL GROUP PROPOSAL

OW240031 Beijing XINHUA Domestic Service in Chinese 0204 GMT 22 Dec 80

[Report by XINHUA reporter Xu Yaozhong]

[Excerpts] Beijing, 22 Dec (XINHUA)--In a recent interview with this reporter, Qu Geping, deputy director of the State Council leading group on environmental protection, put forth a five-point proposal.

Qu Geping is a permanent council member of the China Environmental Science Society and was a permanent PRC representative to the UN Environmental Agency. He has engaged in the work of environmental protection for a long time. He said: Some comrades would turn pale at the mention of environmental protection because they believe that it would cost a large amount and that since our country cannot afford to spend such vast sums, it should be put aside temporarily. As a matter of fact, this is not the case. Take, for instance, the atmospheric pollution in some Chinese cities, which is directly caused by the burning of coal. In order to use no money, or little money, to bring the environmental pollution caused by coal under control, it is necessary to readjust the energy policy. At present, we can start the work in the following five fields:

1. It is necessary to give priority to supplying low-sulphur and low-ash coal for city residents.
2. It is necessary to build centralized heating system.
3. It is necessary to make reasonable use of liquified petroleum gas.
4. It is necessary to impose compulsory use of afterheat. Most of the afterheat of urban industry has not been utilized and has become a factor of environmental pollution.
5. It is necessary to actively develop gasification of coal.

The proposal urges departments concerned to map out a plan first and carry it out in Shenyang, Lanzhou, Beijing and other cities.

CSO: 5000

BRIEFS

JILIN WASTE WATER DISPOSAL--The first phase of China's largest waste water disposal project has been completed and placed into operation at the Jilin Chemical Industry Company. After 1 month of test runs, the project proves to be effective and all its technical standards are near or higher than the state standards. The project can dispose of 96,000 tons of waste water per day that is discharged by chemical fertilizer plants, calcium carbide plants and dyestuff plants. [SK210315 Changchun Jilin Provincial Service in Mandarin 1100 GMT 19 Dec 80 SK]

JILIN RIVER POLLUTION CONFERENCE--The Jilin Provincial Scientific and Technological Association and the Provincial Environmental Protection Bureau sponsored a national conference to assess the pollution of the Tumen River. The conference was held in Tumen Municipality, Jilin, from 5 to 9 December. [SK151347 Changchun Jilin Provincial Service in Mandarin 2200 GMT 12 Dec 80 SK]

JILIN ENVIRONMENTAL PROTECTION CONFERENCE--The national conference on environmental protection and food sanitation work of commercial departments was held from 3 to 12 December in Chungchun, Jilin Province. Participants at the conference revised and adopted the regulations for environmental protection and the regulations for food sanitation control. [Changchun Jilin Provincial Service in Mandarin 2200 GMT 12 Dec 80 SK]

ANHUI ENVIRONMENTAL SCIENCE--The First Congress of the Anhui Provincial Environmental Science Society was held in Hefei from 17 to 21 November. Vice Governor of Anhui, Meng Jiaqin attended the congress and delivered a speech. (Fan Gehe), deputy director of the provincial environment protection bureau, delivered a report: "Get Organized, Develop Environmental Science in the Province." The congress received more than 70 academic theses and reports. It was pointed out that the tendency for environmental pollution and the wrecking of natural resources in Anhui continue to increase. The congress called for efforts to combat pollution and protect the environment in order to realize the four modernizations at an early date. [Hefei Anhui Provincial Service in Mandarin 1100 GMT 22 Nov 80 OW]

SHENYANG SMELTERY POLLUTION CUT--Shenyang, 18 Dec (XINHUA)--Shenyang Metallurgical Plant, once one of the worst sources of pollution in this northeast China city, has halved the pollution it emits by reconstructing its smokestacks and introducing equipment to clean its waste water, a monitoring group at the plant told XINHUA. The group, which was appointed 2 years ago to clean up the smelter, said the plant used to pour out 75,200 tons of sulphur dioxide a year, 40 percent of the city's total. Waste water, containing arsenic and heavy metals, badly polluted the soil and crops, bringing protests from local people. About 10 percent of the workers at the plant suffered from respiratory diseases and lead and aluminum poisoning. The group said that improvements made so far have reduced the monthly volume of acid smoke from 5 workshops to about 1/90th and the workshops now recover 400 tons of sulphuric acid a day. Seven other workshops at the factory, which was built in the 1930's in the city proper, have introduced an enclosed circulation system to clear toxins from waste water. So far, the group said, the system has reduced the amount of heavy metals by 30 percent to around the state standards and saved 7,000 tons of water a day. [Text] [Beijing XINHUA in English 0723 GMT 18 Dec 80 OW]

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BRIEFS

WATER POLLUTION LAW IN FORCE--Beginning on 1 January 1981 sanctions will finally begin to be applied against all organizations which have not installed equipment to purify waste water, or carried out reconstruction or technological measures to protect river water. This obligation was enacted in all republics and provinces through water [pollution] laws which were passed 5 years ago. All the laws called for a transition period for work organizations to prepare for meeting the established obligations. The deadlines, however, were extended, sometimes several times. Now when the last deadline is nearing, requests for extensions are heard again. At the 18 November press conference of the Yugoslav Council for Protection and Development of the Environment it was stressed that there are no longer reasons to extend the deadline. [Excerpt] [Belgrade BORBA in Serbo-Croatian 19 Nov 80 p 5]

CSO: 5000

OIL SPILL COVERS CARTAGENA BAY

Bogota EL ESPECTADOR in Spanish 19 Nov 80 p 12-A

[Article by Dairo Martinez]

[Text] Cartagena, 18 Nov--Agriculture Minister Gustavo Dager Chadid and Mines and Energy Minister Humberto Avila Mora will be briefed on the serious fuel oil contamination over a large part of the city of Cartagena's inner bay after a lighter carrying 3,500 gallons of the fuel from Barrancabermeja to this capital sunk there on 11 November.

The regional manager of INDERENA [Institute for Development of Renewable Natural Resources], Antonio Fernandez Atencio, traveled this morning to Bogota for this purpose; he will also deliver a complete report on the results of the investigation conducted so far by the team of biologists and chemists employed by the institute.

In the meantime, the local harbor master's office, which is responsible for taking any pertinent legal action, summoned the owner of the company Transfucol, Luis Gomez Diette, to testify. He is also the owner of the sunken lighter, and the feeling is that his testimony could provide important pieces of information for clarifying the incident.

The contract of carriage signed by Transfucol with the Colombian Petroleum Enterprise (ECOPETROL) will also be looked into, and a determination will be made as to whether the contamination policy required for the transport of fuels in maritime areas had been drawn up; such policies, however, seem to entail little liability for those engaged in maritime transport.

Meeting

Meeting yesterday, as scheduled, at INDERENA installations were Ricardo Parra and Francisco Castillo, representing the General Maritime and Ports Directorate; Jairo Escobar, the head of environmental management of INDERENA in Bolivar; Carlos Rubio and Antonio Fernandez, from the same institute; Victor Valle, from the Regional Planning Council of Northern Bolivar; Felipe Haquin, from Jorge Tadeo Lozano University; Abel Ariza, the river manager, and other officials; they met to decide what actions should be taken to halt the pollution, which has reached several beach areas.

Recommendations

They agreed on the following recommendations, which were conveyed this morning to the sectional administration for its consideration:

1. Ask the governor to urgently summon a meeting of the area advisory council for special action, pursuant to Decree 1741 of 1978, to coordinate decision-making.
2. Take immediate action before environmental conditions change and hamper work efforts.
3. Open an emergency account to begin work immediately.
4. Include representatives from ECOPETROL and Transfucol in the technical group.
5. Conduct a new survey of the area to determine how far the fuel spill has spread.

Insufficient Resources

Separately, it was learned at INDERENA that the fuel spill has spread over a 25-30 kilometer area from the site where the accident took place, because of the currents in the inner bay, and that ECOPETROL's equipment is inadequate to cope with the emergency, and thus the companies in the area have been asked to make their equipment available.

The INDERENA manager said that citizens must become aware of what is happening and in response to several criticisms by groups opposed to the stand that it has taken regarding this mishap, he stated that it is not a case of sensationalism, merely that the problem is so serious that it is impossible to conceal at present.

Serious Matter

In this regard he pointed out: "We wish it were not serious, but it is more serious than it might seem. They will have no reason to accuse INDERENA of negligence afterwards because we are doing our job."

There are apparently some groups interested in not having much importance attached to the incident, and in this regard the official said that so far decontamination work has not been undertaken and that the only efforts being made are to prevent the spill from spreading and to soak up the part of it on the surface.

The fuel oil spill that started at the ECOPETROL floating pier on 10 November as the lighter was docking spread quickly from south to north. It reached the coasts of the Manga district and even got to the Fishing Club and Naval Base, then spreading along the coasts of Castillo Grande up to the Laguito zone, where several patches have been observed.



An extensive area of Cartagena Bay has been polluted since a lighter carrying 3,500 gallons of fuel sank at the floating dock.

Key:

1. Old city
2. Fishing Club
3. Marine terminal
4. Cartagena Bay
5. Naval Club
6. Floating dock
7. Tierra Bomba Island

As of today authorities had no idea of how much fuel might have spilled into the bay, and INDERENA has asked the people working to dissolve the spill to use chemical agents only with the approval of the institute, because they could turn out to be even more dangerous than the oil spill itself.

Series of Statements

Since the investigation began, the following people have appeared before the harbor master's office: the captain of the tugboat, Nestor Rojas; Chief Petty

Officer Wilfrido Tejeda; Luis Correa, an ECOPETROL engineer; Carlos Aguirre, a Transfucol worker; a contractor by the name of Polo who was present when the lighter sunk; the first officer of the lighter, a man named Morris, and a sailor by the name of Hinestroza.

Nevertheless, the most important declaration in the investigation process is considered to be that of the ship owner, Luis Gomez Diette, the results of which are obviously being kept completely confidential.

According to reports from circles close to the harbor master's office, the causes of the accident, liabilities and blame for it are expected to be cleared up by the beginning of next week.

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CSO: 5000

MP SAID ON HUNGER STRIKE TO SPOTLIGHT SOIL EROSION

Lagos DAILY TIMES in English 16 Dec 80 p 7

[Article by Theresa Ogbuibe]

[Text] Over a week ago, an Assemblyman, Mr. Ime J. Ikpat, representing Western Nait in Uyo Senatorial District of Cross River State announced he was on hunger strike and would remain so until his people got help. He also said he was prepared to give up his November salary to help solve the present problem of erosion at Uyo.

In an interview with Mr. Ikpat the question was put to him as to whether he did not think his action was a little emotional. Will hunger strike save his people? What really is the magnitude of the problem posed by erosion at Uyo? And why has he decided to take such drastic actions.

Maybe I want a message of condolence, was his reply, in a very pensive mood. You know, there is a limit to human endurance. Why should we wait to see a whole land with lives and property buried away?

What is now happening at Uyo, he went on, is worse than erosion that merely washes away the land. Uyo is a commercial town. It is inconceivable to think that the entire land and clay soil is collapsing and being buried or washed away with everything.

It is like an earthquake with a continuous irresistible force for almost a year now. Gradually, Mr. Ikpat raised his voice and seemed more upset.

The four million naira stadium in the town is worst hit. It is now a grave pit. The College of Education that has trained eminent Nigerians may soon become a thing of the past, not to mention a vast sunk land spreading daily like a monster pit from the College of Education to Eka Street down to the Stadium and Barracks Road. Not less than 143 houses and 13 lives have been swallowed already, he said.

But the area concerned is not strictly Mr. Ikpat's constituency, or has the interviewer got it wrong? Defending his actions and quoting the bible and the constitution to support them, the Assemblyman said anybody who knows me well will confirm that I am not sectional. Neither is my Head of State, Alhaji Shehu Shagari. Even though Uyo is not my constituency, I want this nation to know that the area affected and the gravity of the situation is causing a lot of anxiety. Emotionally

speaking, only the Pharoos of the Bible could ignore the tears of his old and feeble citizens who, after spending the last of their life earnings for a place of abode to see tragedy could rejoice.

Section 15, sub section 4 of the constitution says, "the state shall foster feeling of belonging and of involvement among the various people of the federation to the end that loyalty to the nation shall override sectional loyalties."

What has the Cross River State Government done so far about the problem, or is she just sitting and waiting for the Federal Government to come to her aid? Mr Ikpatt understands that the State Government is not strong enough financially to cope with such a disaster. Even the natives have tried their best, Mr Ikpatt continued.

But what can they do in a disaster of this nature? Again, he said the constitution of the Federal Republic of Nigeria directs that the security and welfare of the people shall be the primary purpose of the government.

Mr. Ikpatt denies being a critic or an alarmist and says he is simply an NPN member from Western Insit, Etinan in Uyo, with all modesty. He thinks the President is an admirable and broad-minded man with retrospective thoughts.

"He is a very busy man," he continued. "It is our duty to remind him of things since he is not God. I am sure now that I have reminded him to redeem his promise when he sees the site.

"I am sure he will retrieve this town from further destruction and ruin. He may be shocked to know that the erosion is ten times worse than it was six months ago, during his first visit to the College of Education. There were no loss of lives then. The Assemblyman reminded the interviewer that food and shelter was the symbol of his party NPN and that it is endowed with a clay deposit best suited for bricks, ceramic and pottery industries.

Aid

According to Mr. Ikpatt the human suffering caused by erosion at Uyo is enormous. The nature of the problem is such that the state government's resources cannot meet the needs of the people without the aid of the Federal Government.

Women, children and old people are the worst hit. It has been and continues to be a traumatic experience for the old in particular, it is heart-breaking for them to sit and watch their homes and property vanish.

Mr. Ikpatt is worried that help might reach his people too late if nothing is done now to stop the erosion and rehabilitate the areas and people affected. A lot of people sometimes need emotional support.

CSO: 5000

BRIEFS

CAMPAIGN AGAINST POISONOUS FISHING--A state-wide campaign against the use of poisonous chemicals in fishing has been launched in Cross River State. The campaign which will last two weeks was jointly sponsored by the federal and state departments of fisheries. Launching the campaign in Calabar, the state Commissioner for Agriculture, Fisheries and Natural Resources, Mr. Emmanuel Umana, condemned the use of poisonous chemicals and explosives in catching fish. He pointed out that these obnoxious methods of fishing had caused indiscriminate destruction of the fish population as well as pollution of the water in which fishes breed, thereby rendering both fish and water unsafe for human consumption. The commissioner noted that about three percent of the land mass of Cross River State is covered by rivers, creeks and lakes, while the natural vegetation is too scanty to support livestock, and explained that in the circumstance, fish has not only come to occupy a prime place as a vital source of animal protein, but has also sustained the economy of the coastal and riverine population of the state. He, therefore, called on fisheries extension workers to educate fishermen on the need to increase their yields substantially and to employ natural methods in the exploitation of fish resources. [Edet Charles] [Text] [Kaduna NEW NIGERIAN in English 3 Dec 80 p 3]

CSO: 5000

SEYCHELLES

BRIEFS

SOVIET SCIENTIST VISITS--A Soviet scientist of the Academy of Sciences (USSR) is currently visiting Seychelles to establish contacts with local bodies. This will enable scientists from the two countries to coordinate research, particularly the study of man and the natural environment. Professor Vladimir Sokolov, who teaches at the University of Moscow, also studies the ecosystems and evolution of islands, animal ecology and tropical forests--subjects which can form the basis of an important programme of research of great interest to Seychelles. The professor has described the Aldabra atoll as a unique place of importance not only for Seychelles but for all the world, where studies of the environment and wildlife could be made. Aldabra is a special highly protected area with an existing modern research station that has attracted many scientists from all over the world. Professor Sokolov's short trip to Seychelles includes visiting some islands close to Mahe to have a look at the local wildlife and to find out how this is protected in Seychelles. [Text] [Victoria NATION in English 4 Dec 80 p 2]

CSO: 5000

IMPACT OF PROPOSED PAPER MILL UNDER STUDY

Johannesburg THE CITIZEN in English 4 Dec 80 p 3

[Text] A DECISION on whether to establish a R500-million paper mill at Richard's Bay was imminent and the Government would, if the project was realised, consider accepting responsibility for effluent disposal, the Minister of Water Affairs, Forestry and Environmental Conservation, Dr Nak van der Merwe, said in Pretoria yesterday.

The establishment of the mill would not only be a major step in the development of the area, but would be of economic importance to the country as a whole, he said in a statement.

The effluent would be disposed of through a regional system, which would also serve other bodies in the area.

Out to Sea

His department was investigating the possibility of conveying the effluent far out to sea through a pipeline which would be equipped with an effective discharge system to ensure proper dilution and dispersal.

To ensure that acceptable standards were set for the quality of the effluents to be discharged into the sea, in-

tensive research had been undertaken by the consultants and by the National Institute for Water Research, the National Re-

search Institute for Oceanology, the Oceanographic Research Institute and the Sea Fisheries Institute.

Initial reports by these bodies were being studied and consultants had been briefed to produce possible designs to meet the requirements.

Tabled

Dr Van der Merwe said that if his department decided to go ahead with the project, the results of this work would be tabled in Parliament next year in the form of a White Paper.

"It is necessary to stress that the Government will impose purification standards and diffusion requirements adequate to ensure that marine fauna and flora and associated habitats are not damaged to any significant degree, and that no nuisance results to users of either the sea shore or the waters in the vicinity," the Minister said.

"Full account will be taken of all internationally accepted standards at all times." — Sapa.

BRIEFS

STORM CAUSES SERIOUS DAMAGE--On the night of 30 November-1 December there were torrential rains in Kinshasa. The raingage measured 450 millimeters. There was much damage including houses which were crushed or flooded. Others are still standing but have large cracks or are without roofs. Thus, there are now many families without shelter. In general, the houses that were destroyed were those made of earth, such as those in Lingwala, Kintambo and Barumbu. Hundreds of residences in Kintambo and Bangalungwa were constructed in the vicinity of the Makelele River which had already taken many victims before then. Everywhere people were spending the night outdoors. Even more infuriating, the electricity was out in Kinshasa that night. The outage lasted 2 days in Bandal-Synkin, and in Makala, the electricity is still out. [Excerpt] [Kinshasa ELIMA in French 7 Dec 80 p 2]

CSO: 5000

BRIEFS

TREELESS DESERT--Each Zimbabwe family was using a tree a week for firewood and poles, the Minister of Works, Mr Clement Muchachi, said yesterday when he planted a silver oak sapling in Gwelo to celebrate National Tree Day. It was therefore not surprising that the country's woodlands were disappearing. "If this situation is allowed to continue our country will soon become a desert," he said. Mr Muchachi, who planted the sapling at his Ministry's Gwelo depot, said many women already had to go long distances to find firewood. "Because we are taking trees faster than we can replace them, we need to plant new trees quickly," he said. The president of the Confederation of Zimbabwe Industries will present 3 000 trees to the Government's rural tree-planting programme when its chairman, Mr Sampson, plants a tree at the industry headquarters tomorrow. [Text] [Salisbury THE HERALD in English 9 Dec 80 p 5]

CSO: 5000

ESTONIAN SUPREME SOVIET COMMITTEE MEETS ON RESOURCE MANAGEMENT

Tallinn SOVETSKAYA ESTONIYA in Russian 26 Oct 80 p 3

[Text] A regular session of the Committee on the Protection of Nature and the Rational Use of Natural Resources of the Estonian SSR Supreme Soviet was held in Kokhtla-Yarve; it was conducted by Ye. Filatov, chairman of the committee. The address of the USSR Supreme Soviet deputies' concerning the conduct of the all-Union review of the distribution and production application of the best work was discussed; M. Vannas, deputy chairman of the Presidium of the Estonian SSR Supreme Soviet, provided the committee with information on this subject.

The fulfillment of the requirements of the Estonian SSR Code concerning mineral resources as pertaining to the comprehensive use of natural resources in northeastern Estonia was also discussed. Reports on this subject were given by the following: Kh. Lekhiste, ispolkom chairman of the Kokhtla-Yarve Rayon Soviet of People's Deputies; V. Seryn, technical director of the Estonian Production Association for the Extraction of Shale and O. Kaldre, first deputy minister of the Estonian SSR Forestry and Woodworking Industry. The committee noted that the intensive working of shale is closely related to the use of other minerals, as well as to the protection of nature. Work has been carried out on the technical recultivation and reforestation of the shale quarries.

Despite the continuously increasing attention which is devoted to the comprehensive use of natural resources, there are also substantial inadequacies in this area. A better accounting should be made for the following: water, peat, forestry materials, gravel, as well as minerals and other natural resources; the comprehensive use of these materials should be better monitored. A long-range plan for the protection of nature in northeastern Estonia is lacking.

The appropriate ministries, state committees and agencies have been instructed to eliminate the inadequacies pointed out at the session and to specify measures for the comprehensive use of minerals and natural resources in northeastern Estonia.

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CSO: 5000

ELECTRIC POWER AND NATURE CONSERVATION

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 31 Jul 80 p 2

[Article by P. Sapozhnikov, USSR deputy minister of power and electrification]

[Text] Power engineering is correctly called the basis of the bases of technical progress, the main moving force in the work to accelerate the rate of development of the national economy. However, there is no less justification for assigning our industry the number one spot with regard to its effect on the environment. In operation day and night are approximately 500 thermal electrical power stations and plants burning millions of tons of organic fuel. They are responsible for approximately one-quarter of all the harmful emissions discharged into the atmosphere by industrial enterprises.

The "Law Concerning Protection of the Air," which was adopted at a session of the USSR Supreme Soviet, requires the implementation of serious environmental protection measures in all branches of the industry. How is this work being carried out at power enterprises?

The nature protection policy of the USSR Ministry of Power and Electrification is being carried out along two general lines. The first is the improvement of the existing equipment: boilers, units, gas purification installations; and the modernization--at the appropriate times--of this equipment in order to reduce harmful emissions. The second is the development and application of waste-free and low-waste processes for the production of electrical energy.

It would seem that with the increase in the number of electric power plants their effect on the environment would also grow. But is this pattern truly inevitable? Not at all. Experience shows that at those enterprises where a sufficiently responsible attitude is taken toward this issue, the harmful influence on nature can be reduced to permissible limits.

Let us take, for example, one of the most powerful power plants, the Zaporozhskaya GRES. Four of its seven boilers operate on solid fuel, the main polluter of the atmosphere. But the collective of the plant approached environmental protection carefully and thoughtfully. The boilers were equipped with highly efficient ash traps, which are monitored 24 hours a day. The country's first automated system for monitoring air pollution was established here. A whole series of scientific sections, headed by the Moscow Power Engineering Institute imeni Krzhizhanovskiy, were enlisted in this work. Plans call for the system to go into operation during the current year.

Analysis shows that in order to reduce all indicators of the "power plant--environment" exchange it is essential to first increase the efficiency of fuel use. One way to achieve this end is to expand the combined output of heat and electric power at central heating and power plants. For this reason we adhere to a policy of centralized heat supply systems providing heat generated by major TETs to cities. This will make it possible to eliminate the multitude of small boiler houses which provide heat and which frequently produce smoke at the level of the upper stories of multistory buildings.

At the present time about 1800 cities in the nation have centralized heat supply systems. We understand that by today's standards this is insufficient. The All Union Scientific Research and Planning Institute of the Power Industry has developed plans to expand the operational radius of the centralized heat supply systems for industrial centers as Yaroslavl' and Perm', Kaunas and Tallinn, Sevastopol' and Irkutsk, Zhitomir and Prokop'yevsk. By the end of the current year about 60 percent of the heat which the cities need will be provided by central heating and power plants.

But even one major TETs pollutes the air above a city, even though it pollutes less than dozens of boiler houses. In order to meet the strict requirements for the maximum permissible atmospheric emissions, a comprehensive plan has been developed and is being applied in the field of power engineering. It includes provisions for equipping newly installed boilers with highly-efficient ash trapping units and the modernization and renovation of obsolete ash traps. The scale of this work can be judged from the following figures. The plans for 1980 called for renovation of ash traps at more than 70 boiler units and the construction of 27 new trapping units with a total productivity of 17.3 million m³ per hour. More than 10 million rubles of capital investment have been allotted for these purposes.

The industry's scientific and planning units are doing a great deal in this area. One of the new technical discoveries is a combined ash trap, proposed by specialists from the All-Union Thermo-technical Institute imeni Dzerzhinskiy and from Soyuztekhnenergo [expansion unknown]. It was developed especially for the high-ash coals of the kind that come from Ekibastuz; it provides a very high degree of cleanliness—up to 99.5 percent. The first ash trap of this kind was installed at a power unit with a capacity of 500,000 kilowatts at the Ekibastuzskaya GRES No 1.

An experimental electrofilter, developed jointly by Soviet and Czechoslovak specialists, has given excellent results in field testing carried out at the Ladyzhinskaya GRES. Plants of the Minkhimmash [Ministry of Chemical and Petroleum Machine Building] are preparing to manufacture it on a mass production basis. The application of measures to eliminate oxides of nitrogen in the fire boxes of boilers have yielded good results at a number of units which are part of the Kostromskaya, Karmanovskaya, Syrdar'inskaya and other plants. Atmospheric emissions of this toxic substance have been reduced to one-half to two-thirds of the previous levels. There are also a number of promising projects for reducing significantly the amount of another harmful component in flue gases, namely sulfur dioxide.

Much work is being done to reduce the amount of water used for industrial needs: at present the power industry consumes more water than all other industrial

sectors. The main trend here is toward the establishment of closed water supply systems. This approach is being given practical realization in the plans for effluent-free power plants, some of which are already in the construction stage. This kind of system will be used at the following plants: the Novotul'skaya and Belotserkovskaya TETs's, the Minskaya TETs No 3, the Tyumenskaya TETs No 2, the Novo-Sibirskaya TETs No 5 and others. In 1980 recycled water will account for 54 percent of total water consumption. Plans call for the introduction of water recycling systems with a total capacity of 31.2 million m³ per day at a cost of 122 million rubles.

Another acute question concerns pollution of land by ash dumps from thermal power plants. From year to year we are stockpiling on the earth's surface tens of millions of tons of ash and slag, which are the source of pollution to the soil, water and the air. There is only one way out of this: the national economy must use these wastes on a greater scale; they can be used widely in construction and agriculture.

Some good experience has already been accumulated in this area. In the Baltic republics, for example, more than two million tons of ash from the Estonskaya and Pribaltiyskaya GRES are being used annually to fertilize fields. Plans call for the industry as a whole to utilize 10.2 million tons of ash, including 7 million tons for the production of building materials. But on a national scale this is still not much. The concerned ministries, especially the Ministry of the Construction Materials Industry, must show greater initiative and persistence in solving this important problem.

On the subject of initiative, it should be said that not all enterprises of the power industry have actively joined in the work to protect the environment. The plan for the introduction of treatment facilities was only 77.4 percent fulfilled last year. And certain units show very low indicators. For example, the Azglavenergo [probably Central Asian Main Power Administration] used only 26.7 percent of the resources appropriated for these purposes.

We see the main reason for this situation in the fact that some employees view their production unilaterally; they attempt to cover up their negligent attitude toward environmental questions with "objective" difficulties. We still have enterprises which are not meeting the norms for atmospheric emissions which pollute the sky over our cities. They include the Kaliningradskaya GRES No 2 and the Volgogradskaya GRES. The ministry is taking and will continue to take the strictest measures against builders and users who fail to fulfill environmental protection requirements.

It is obvious that there now exists a need to provide a reliable economic foundation for environmental protection. I shall clarify this thought. The economic benefit obtained through a reduction in fuel consumption compared with the established norms can be calculated with accuracy down to the ruble. But what can be done when the subject is the protection of nature? Our institutes are presently working on industry-wide methods for calculating the economic benefit of measures to protect the air from harmful power plant emissions. But the practical application of these methods will depend on the development of the Union-wide criteria for the effectiveness of these and other environmental protection measures.

A special board for the protection of nature was recently established within the system of the USSR Ministry of Power and Electrification for the purpose of guiding, organizing and coordinating projects for the protection of the air and water. Its functions include the planning of all the environmental protection activities of the ministry, the implementation of departmental monitoring of the observation of legislation in this area and the fulfillment of decisions made by directing organs.

Measures have also been taken to strengthen the scientific base. The All-Union Thermo-technical Institute imeni F.Z. Dzerzhinskiy, which has been named the leading institute on this subject, has created departments for the protection of the air and water against effluent from electrical power plants. A section concerned with environmental protection has been formed for the systematic publication of information materials dealing with the best experience and the achievements of domestic and foreign science and technology in this area.

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CSO: 5000

NERO LAKE POLLUTION REEXAMINED

Moscow PRAVDA in Russian 24 Sep 80 p 3

[Article by Z. Gagarina, reclamation engineer of the oblispolkom agricultural administration, P. Smirnov, honored agronomist of the RSFSR and B. Khokhlov, candidate of agricultural sciences, Yaroslavskaia Oblast': "How Can the Lake Be Helped?"]

[Text] Seven years ago PRAVDA wrote about the problems of Lake Nero, which is near Rostov (Velikiy). The article discussed the shoaling of this major body of water, and the large-scale silting which has taken place here; up to 200 million tons of sapropel have accumulated on its bottom. This has reached the point where the basin of the lake can no longer hold all the waters of spring; they flood thousands of hectares of the surrounding lands. Valuable meadows become swamped and the grass cover deteriorates. It is not uncommon for fish to die of asphyxiation in winter. Due to the proximity of the water, specialists fear for the unique Rostov landmarks.

Over a period of years the Yaroslavl' CPSU Obkom and Oblispolkom have posed to the appropriate organizations the question of restoring the entire zone and of removing the sapropel from the lake: for centuries the sapropel was used by the Rostov vegetable growers as fertilizer. In 1971 the Rosgiprovdokhoz [Rostov State Design Institute for Water Management] Institute prepared the technical and economic groundwork.

How did they intend to help the lake at that time? By deepening it and removing the accumulation of silt. The plans called for a broad reclamation program for the surrounding lands, for the establishment of drainage systems and pumping systems.

However, this plan was forgotten, and the solution to an important problem was put aside for long years. But did the problem really lose its urgency? No; the agricultural economy of the oblast essentially depends on the condition of Nero.

"The lake must be cleaned up no matter what," say the employees of the Rostov CPSU Gorkom. There should be no further delay.

But why has that which was planned remained undone? It turns out that the reclamation specialists who were in charge of implementing the plan came to doubt the correctness of the chosen path. And then the planners received new assignments,

and new documents were born. But if the earlier plans arouse optimism, the later versions arouse concern.

Here are two documents: "A General Plan for the Comprehensive Use of Land and Water Resources of the Lake Nero Basin," which was prepared by Rosgiprovodkhoz in 1974, and technical and economic documentation for the construction of a water reservoir for farms which cultivate onions, which was prepared by Mosgiprovodkhoz [Moscow State Design Institute for Water Management].

What attracts attention first of all? In both cases the plans call for the lake's volume to be increased not by removing the sapropel but rather by erecting retaining structures. This is being done despite the statements by a number of scientists that raising the water level of the Nero is not to be permitted, as it will lead to a deterioration of the underground water flow and to erosion of the soil. The matter is complicated by the fact that the level of the ground waters here is high even without this. And with irrigation it will rise still more, and within 10-15 years it will reach a critical mark--about a meter from the surface of the earth.

The question arises: is it necessary to raise the lake above the floodplain and thus to shut our eyes to the obviously unfavorable results which this measure imposes on nature? It would seem that another path should be taken; stricter account should be taken of the 25th CPSU Congress requirements concerning the need to improve prognoses about the influence of production on the environment and to take into consideration its possible consequences when preparing and making planning decisions.

This kind of approach is especially important with regard to Lake Nero, which has a rare combination of favorable factors: a good supply of water from numerous rivers and streams and a sufficient outflow through the Veksa-Kotorosl'. This entire system represents a natural hydro-network. In addition, the lake has a bottom which is impermeable to water; it also has gently sloping banks, which are not prone to collapse, a large surface area, which simplifies the construction of water regulating installations. The proximity of irrigated lands is also important.

A careless step should not be taken, lest this entire complex worked out by nature herself be disturbed. Large areas of good bottom land will be buried under dams; the natural beds or rivers will disappear. Fish spawning grounds and reserves, as well as other wildlife sanctuaries will be eliminated.

Moreover, the plan is hardly justified from the point of view of expense. It calls for very expensive hydro-technical installations. It includes great expenditures for necessary auxiliary construction unrelated to the reclamation: the building of dams to protect Rostov and Porech'ye-Rybnoye from flooding; the laying of drainage and sewage networks in Rostov, the organization of a fish hatchery on the lake due to the destruction of natural spawning grounds, etc.

And one no less important factor: the proposed irrigation-drainage systems are labor intensive and expensive to operate. Annual operating expenditures will exceed 9 million rubles. The plans call for the installation of about 160 pumping

stations and the initial operation of 667 pieces of irrigation equipment. The electrical transmission lines alone will extend for 359 kilometers. Of course, for some people it is tempting to be able to carry out this kind of gross volume of work. However, the use of such a large amount of equipment is, in our view, not sufficiently justified. Moreover, 1,380 people will be needed to service this armada of machines.

This cannot all be dismissed. But perhaps it is agriculture which will turn up in the winning position? No, the prognoses sound pessimistic: with the rise in the water level of the lake and the flooding of the bottom land, the conditions for the cultivation of onions, which are the main crop in this area, deteriorate. Fearing the water, the farmers are forced to leave the sectors which are rich in humus for the podsolized soils located higher up. It is true that the plan promises that the expenditures will produce a significant yield: in 1990 the production here will be 80,000 tons of onion and 40,000 tons of chicory. Grain yields will grow, too. At the same time, however, the area cultivated with vegetables other than onions will be reduced to one-sixth the present level, and the area under potatoes will be reduced to one-half the present level.

When one weighs all the pro's and con's, one immediately thinks of the simpler and less expensive solutions which were developed, discussed and not adopted. One of the reasonable solutions, it seems to us, is to set out in the conclusion of the experts' section of the Yaroslavl'sovkhozvodstroy [Yaroslavl' Oblast State Farm Administration for Water Resources Construction] management. It proves by means of calculations that there is no need to increase the volume of Lake Nero by increasing the water level of the lake. Even the present volume of the basin provides for the accumulation of the necessary amount of water for irrigation. It is only necessary to improve the circulation of the lake; and this requires that the Veksa-Kotorosl' bed be deepened. Convincing evidence is also provided for the advisability of gradually removing the sapropel from the bottom of the lake; the unacceptability of the plan to raise the level of the lake through the use of dams is also emphasized. This conclusion is based on the proposals of 17 various organizations.

A similar viewpoint was shared and supported in its time by an expert committee of the Council of Technical Expertise of RSFSR Gosplan, under the chairmanship of I. S. Shatilov, academician of VASKHNIL (All-Union Academy of Agricultural Sciences imeni Lenin) and B. B. Shumakov, corresponding member of VASKHNIL.

But what has happened? These remarks were ignored by Mosgiprovdokhoz. Nor were conclusions drawn from the experience of the obviously unsuccessful planning of reclamation projects in the Kotlovina basin; the ecological relations of many components of the natural complex were not taken into account at all there.

And there are instances such as these: the reclamation systems built according to Rosgiprovdokhoz plans proved in significant measure to be unsuitable for use. The drainage networks were first rejected for 2,000 hectares, then for an area of 6,500 hectares. Of the drainage systems which have been retained, (and these cover somewhat more than 6,000 hectares), the systems developed for 4,500 hectares are being reorganized. The main flaw of these reclamation installations is the negative influence on the ground water regime.

Thus there are reasons to analyze carefully the effectiveness of the planners' work and the quality of the documents which they provide. Unfortunately, this is not yet being done.

In the meantime the danger of a new reclamation option for the Nero basin exists. Although the technical-economic documentation has not yet been confirmed, its rough draft is already being implemented: more than 60 different facilities are being built at a total cost of about 50 million rubles. Research and planning work is being carried out.

The situation is highly paradoxical: the document must still be passed by state experts, it prompts a mass of objections and reprimands but, nonetheless, everything in the document is given the "go ahead."

What is the position of the Yaroslavskaya Oblast organizations on this important question, which by no means concerns reclamation alone? The position could be more consistent. Previously they were completely in support of the plan to deepen the lake, but now they have agreed to the latest Mosgiprovodkhoz scheme. Possibly it is worth studying more thoroughly and taking greater account of the conclusions and ideas of the specialists who know the local conditions.

It is true that the solution of the problem has, indeed, been dragged out. But this does not provide a reason for agreeing to any option at all. This kind of position would not appear to help the matter. The fate of the Nero is not a trivial matter, and it would be a big mistake to fall under the influence of those who see only the technical side of the problem and who forget about the kind of lake (one that has become more beautiful or one which has become disfigured) it will be when this pearl is handed down to future generations.

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LAKE SEVAN CONTROL MEASURES

Yerevan KOMMUNIST in Russian 14 Sep 80 p 3

[Article by V. Sarkisyan, main engineer of the Yerevan Hydrometeorological Observatory of the Armenian Republic Administration for Hydrometeorology and Monitoring of the Natural Environment: "Preserve the Riches of Sevan"]

[Text] The pearl of Armenia is the Sevan, the world's highest major fresh water lake; it has attracted lovers of nature since ancient times.

The main wealth of Sevan lies in its water resources. Thanks to its purity, transparency and high taste qualities the lake's water was used--until recently as drinking water by the local residents. With the help of Sevan waters arid lands, including not only those which surround the lake but also enormous areas of the Ararat plain, have become flourishing orchards and fruitful fields.

The waters of the rivers which flow into the lake and of the lake itself are widely used at the present time to meet irrigation needs and to provide industrial and residential water supplies.

However, the basin of Lake Sevan is one of the most intense sectors of limited water use in Armenia. During the summer and fall periods the majority of the rivers which flow into the lake either dry up or the water is completely diverted for economic needs.

The demand for water has been especially noticeable this year as a result of the dry weather and the dehydration of the soil in certain regions; it also results from the low water level of the republic's rivers.

For this reason there is a question which is more acute now than ever before, concerning the conduct of comprehensive investigations to determine the optimal level of water in the lake, ways to preserve its qualities and to use rationally and reproduce the natural riches of its basin.

But how is water used and water use monitored at the present time?

There are in the basin of the lake about 45 interfarm and 100 intrafarm sovkhoz and kolkhoz canals and irrigation ditches, as well as 10 pumping stations which help in the irrigation of agricultural fields. The Ministry of Water Resources draws up

a plan for the irrigation period; the plans specify the amount of water to be drawn from the rivers by each canal and irrigation ditch. The amounts are determined on the basis of water norms for fields growing various crops.

The metering of water in intrafarm canals is carried out at an extremely low level of accuracy. And, indeed, how can one talk about accuracy when the canals either have no measuring devices at all or unsuitable ones? Spillways have been ruined, and gages to measure the water level have been often incorrectly installed or not attached at all. There exist numerous "secret" pumping installations and irrigation ditches built by private individuals to water their own kitchen gardens.

The larger interfarm canals, which are the basic water intake installations, have concrete spillways to measure water consumption. Here, too, water is not drawn according to the plan. Nearly everywhere water flows through the canals in amounts greater than stipulated by the norms. For example, the plan called for the Adiamanskiy Canal to draw 470 liters per second from the Argichi River in one month, but when the intake was monitored, it turned out that 1,800 liters per second were being drawn. At Metsara 215 liters per second were being drawn rather than 120. At Yarpuzlui-aru 435 liters per second were being drawn instead of 30; at Sariara 430 liters per second were being drawn instead of 315, etc.

What is the reason for this water consumption which exceeds the norms? We ask this very question of the directors of the irrigation system administrations. They answer: "It lies in the poor repair state of the water intake installations." They explain that interfarm canals lose about 50 percent of the water through cracks in the concrete foundations and walls, while intrafarm canals and irrigation ditches, which are primarily made of earth, lose even more--65 to 70 percent.

More resources are being spent to repair and restore water-intake facilities; however, the effectiveness of the results has not been seen yet.

A walk along the roads of built-up areas, especially at night, makes it possible to see what happens to this "ownerless" water after the fields and gardens have been watered. Some of the water, having run a relatively long course, in the end flows into the lake, but most of it infiltrates into the deep layers of the soil, and this creates new swamp areas and increases old ones.

Nor are spring waters used here as they should be. At a time when the republic has an acute need for drinking water, a subject on which the newspaper KOMMUNIST has written more than once, many springs of the Lake Sevan basin are used for irrigation. There are, for example, the Akumskiye springs with a total output of about 1,200 liters per second. The Yarpuzluyskiye springs, with an output of 1,500 liters per second are used for irrigation.

But how do matters stand with regard to waste water in this region?

The Sevan basin has more than 50 industrial and public utility enterprises, the city of Kamo, the settlement of Martuni and the rayon center of Vardenis, as well as other settlements. Their waste water is discharged into the lake, about 30,000 m³ per day. An inspection has established that the water intake installations of industrial and public utility facilities do not have water-measuring devices nor do the waste water discharge points have flowmeters.

The waste water of the Martuni settlement is not fully treated, and nearly 40 percent of it (and all of it in the evening hours) goes into the Martuni River without treatment and from there into the lake, causing damage to its fauna and flora.

Six biological and 14 preliminary treatment facilities with a total capacity of 9,000 m³ treat 4,000 m³ of polluted waste water per day. Thus, every day about 26,000 m³ of polluted waste water goes untreated into Lake Sevan and the rivers which feed it.

Enormous resources have been allotted recently for the preservation of the level and the establishment of the biological equilibrium of the lake. Construction is being completed on facilities to divert part of the flow of the Arpa River into Lake Sevan; the diversion of water for power purposes has been halted.

However, the measures being taken will prove inadequate if the organizations concerned with the solution of Sevan's problems, the Ministry of Reclamation and Water Management, the industrial enterprises of the city of Kamo, the cheese plant at Martuni and others, do not contribute to the rational use of the lake's water resources and fight to prevent its pollution.

Sevan is a landmark of nature; it must live at all its beauty for the good of our present and future peoples.

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